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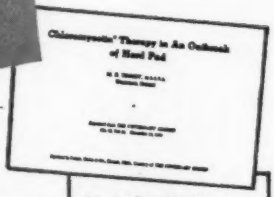

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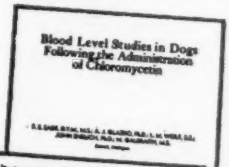

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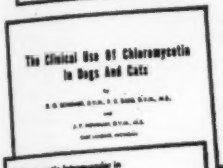

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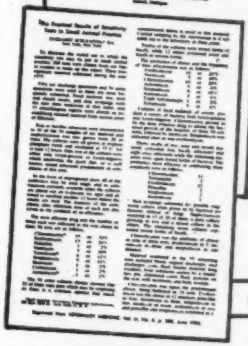

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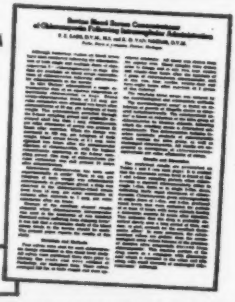

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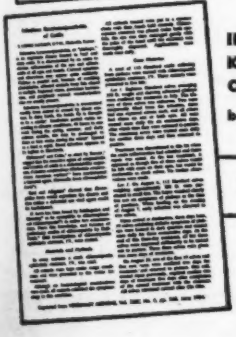

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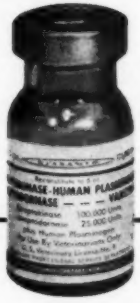

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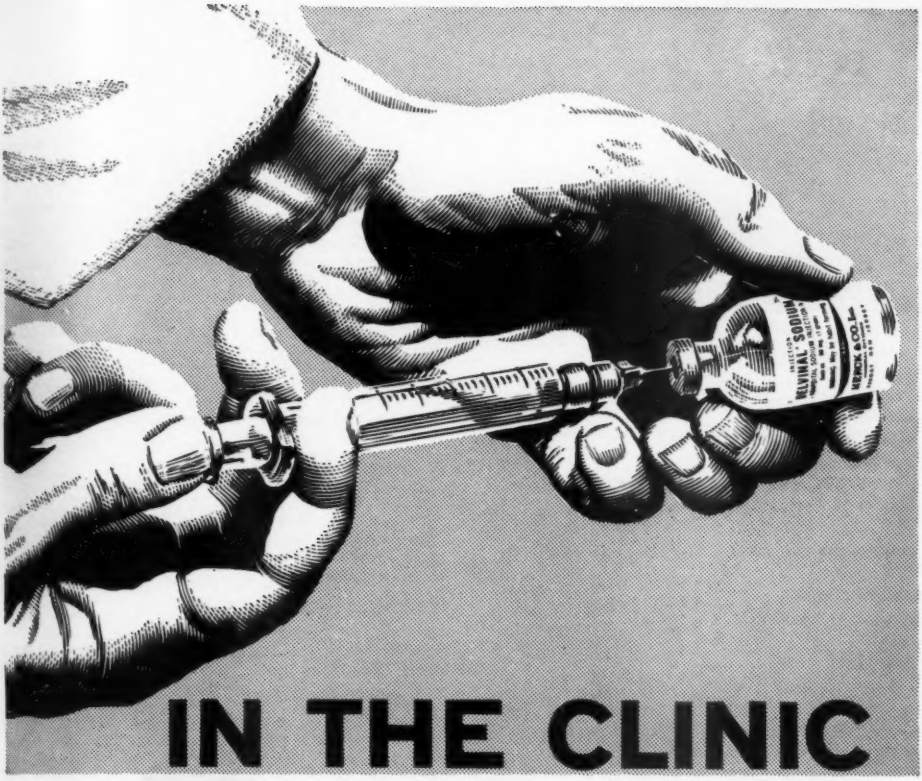

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R. C. Klussendorf, B.S., D.V.M.

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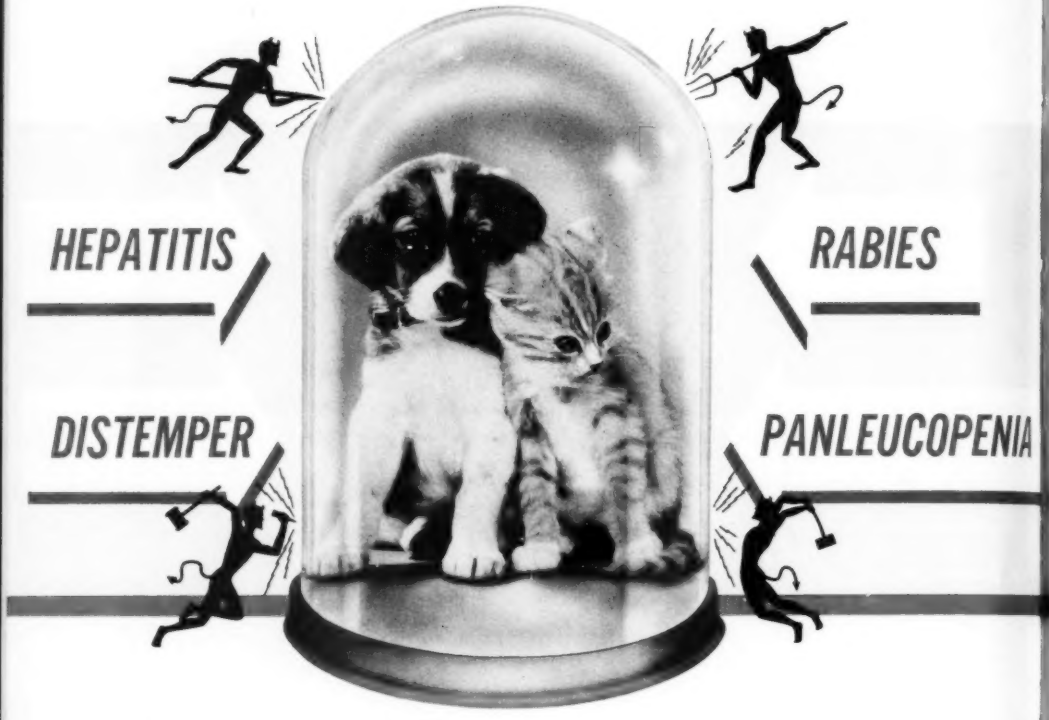

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REFERENCES: 1. Mosier, J. E.: Vet. M. 50:605 (Nov.) 1955. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Pollock, S.: J. Am. Vet. M. Ass. 129:274 (Sept.) 1956.

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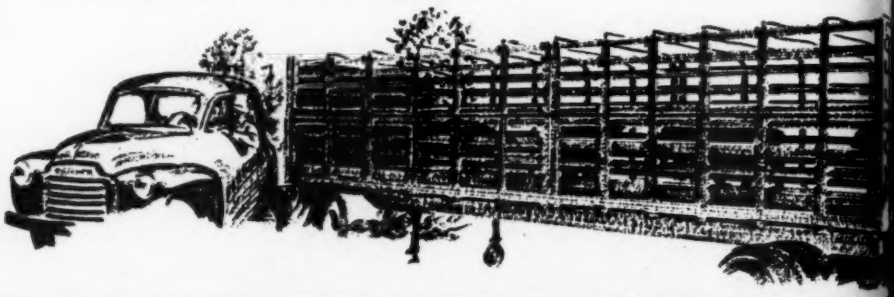

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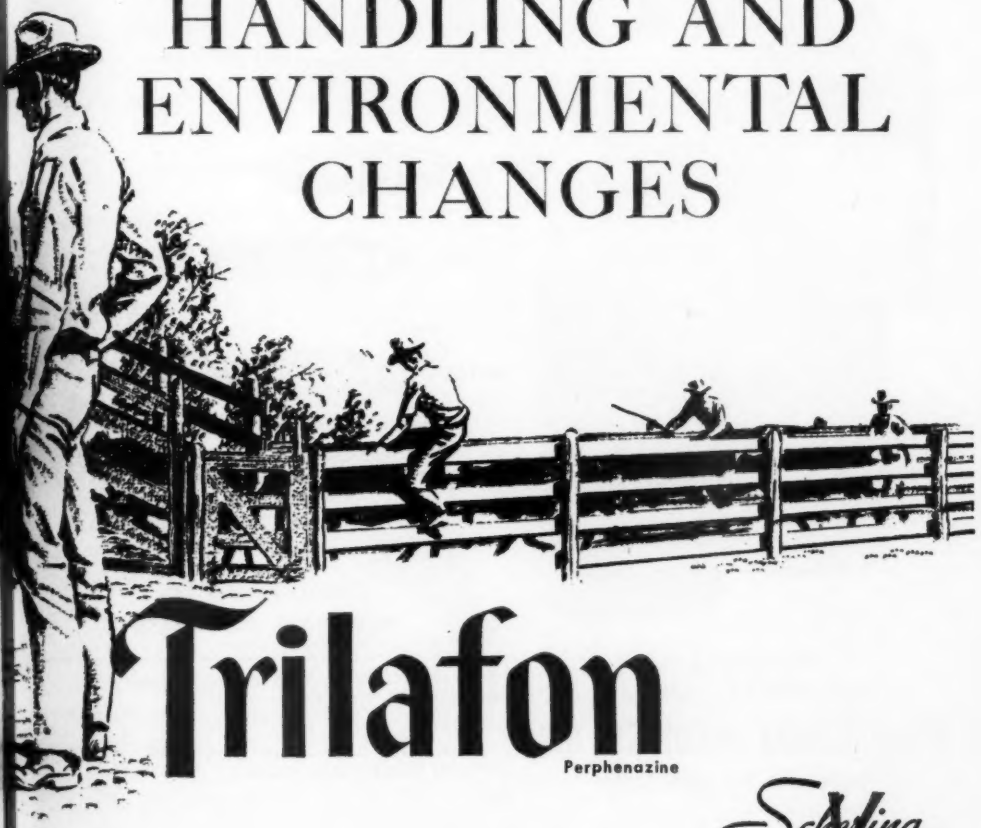

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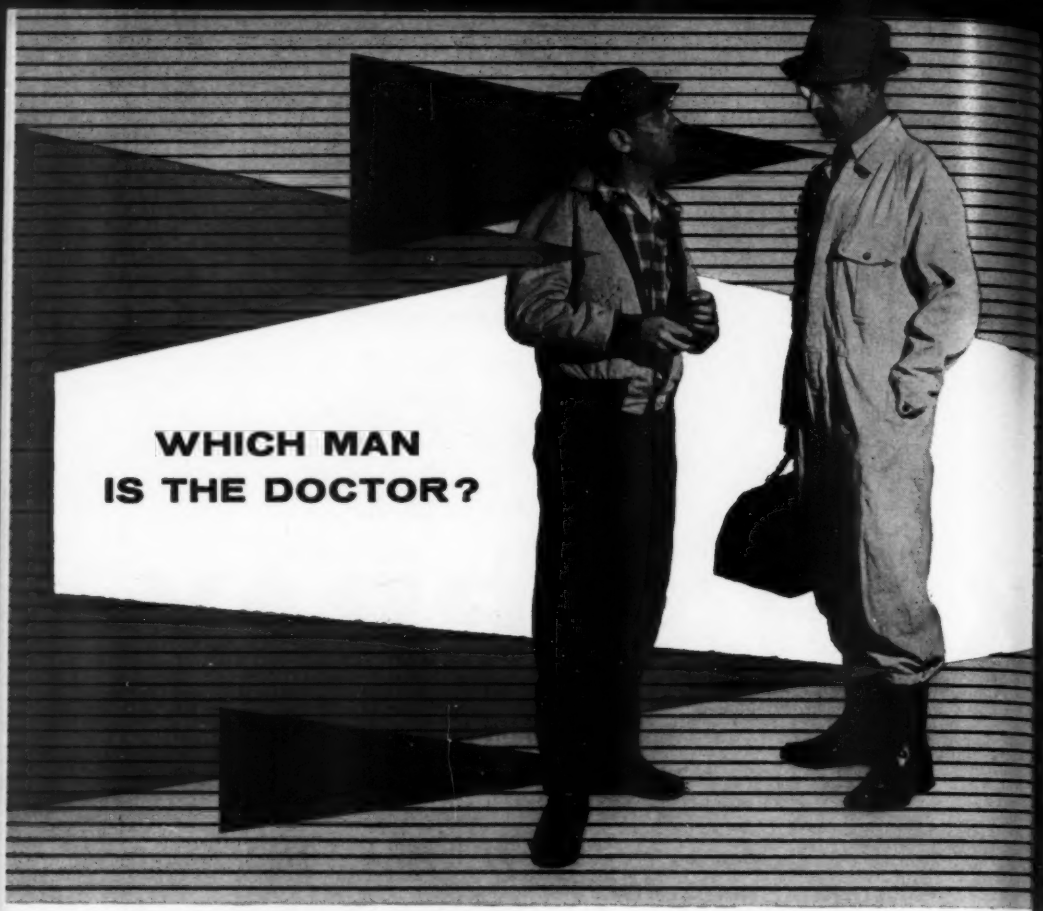

Only one of these men looks like a doctor—but in the confusing situation that exists today in the treatment of livestock disease, there are lots of laymen (just like the farmer in the sketch) who are in effect trying to do the job of a veterinarian but without the professional skill and knowledge that is essential. Couldn't such a trend be harmful to the graduate veterinarian, to the ethical supply house and ultimately to the whole livestock industry?

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News Comment

Midwest Family Farm

Economic research suggests that strength of the Midwest family farm will increase rather than decline as suggested by some who visualize overwhelming growth of corporation farming. Percentage of corporation farms in Iowa is reported by Iowa State College economist Earl Heady to be decreasing, and is now down to 0.2% of the total.

The average farm is quite certain to be larger considering efficiency of modern farm machinery. Where a quarter section once used to be considered ample for labor capacity of an average farm family, more land can be handled without neglect of crops by the same unit equipped with more horse power as more efficient and versatile machines

Tomato Cattle Feed

A pilot plant has been constructed in Florida for processing and drying of cull tomatoes. Based on experiences with citrus pulp, proponents of the project are hopeful a useful cattle feed can be produced.

Protein for Swine

It has been demonstrated repeatedly that protein supplements for swine up to the approved standards of the National Research Council may be inadequate for proper amino acid requirements. With this has come the realization that the cart has been placed before the horse. Providing adequate amino acids in the diet of a weanling pig has reduced the necessity of a high level protein ratio.

Immunity Independent of Titer Levels

Dr. Jonas Salk reported to the American College of Physicians that blood titer level of persons vaccinated with poliomyelitis vaccine was not a true index of immunity.

He cited experience to support the concept that immunity depends on "a hyperactive immune mechanism which may be triggered by natural exposure."

Feedpower

Improvement of growth and production of all classes of livestock during the past half century have been graphically illustrated. Relative efficiency is remarkable. More recent improvement in production of hens and cows confirm that the livestockman has bred into his animals a potential for growth and production not yet realized. As improved rations are provided, the gap between potential and reality has lessened.

Comparative standards for 1930 and 1958 emphasize both selective breeding and improved feeding for efficient production. The process to improve continues to ever higher standards.

Area of Activity	1930	1958
Layers–Eggs per hen	121	199
Feed per dozen eggs	7.8 lb.	4 lb.
Hogs–Age to market	6-8 mo.	4¾ mo.
Feed per 100 lb. gain	425 lb.	267 lb.
Milk per cow per year	4,500 lb.	6,320 lb.
Broilers–Age to market	14 wk.	9 wk.
Feed per 1 lb. gain	5 lb.	2.3 lb.

Dispensing Veterinary Products

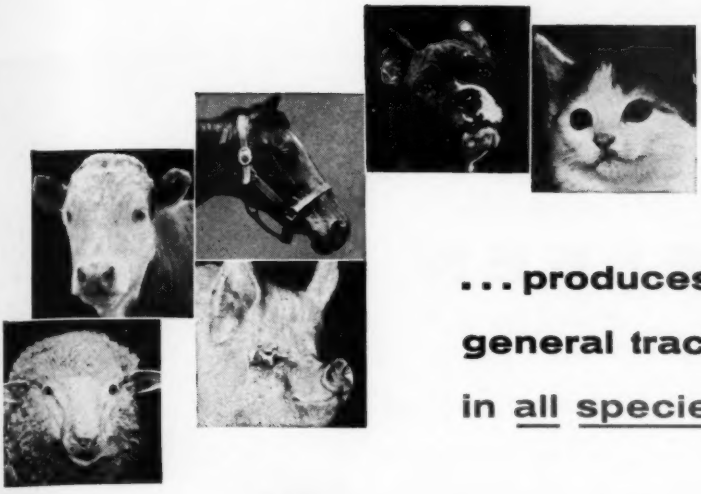
Writing in Drug Trade News for May 5, 1958, Dr. Paul C. Olsen has the effrontery to suggest that pharmacists are competing with veterinary practitioners. He states, "It is well known that among veterinarians a small animal or pet practice in a big city is one of the lucrative fields in which to engage. Such practices usually provide for hospital care for affected pets. That, combined with a relatively high use of injectable, provides intense competition for drug stores."

Doctor Olsen's statement indicates a remarkable lack of information regarding the activities of veterinary practitioners. His statements reveal him as an extreme objectionist to the development of favorable veterinary-pharmacist relationship, a problem which has commanded the attention of sincere groups of late.

California Dairy Statistics

California now ranks sixth among the states in total number of dairy cows. An average of 868,000 were milked in 1957. In average production per cow, a record 8,880 lb. is posted, exceeding the national average by 2,718 lb. or 44%.

Commercial milk production increased over 10% in 1957 over the previous year. Large population increase has created the demand to maintain average per capita consumption. California had 1.5% more cows in 1957 than 1958; increased production per cow by 3.4%, while increasing total milk production by 5%.



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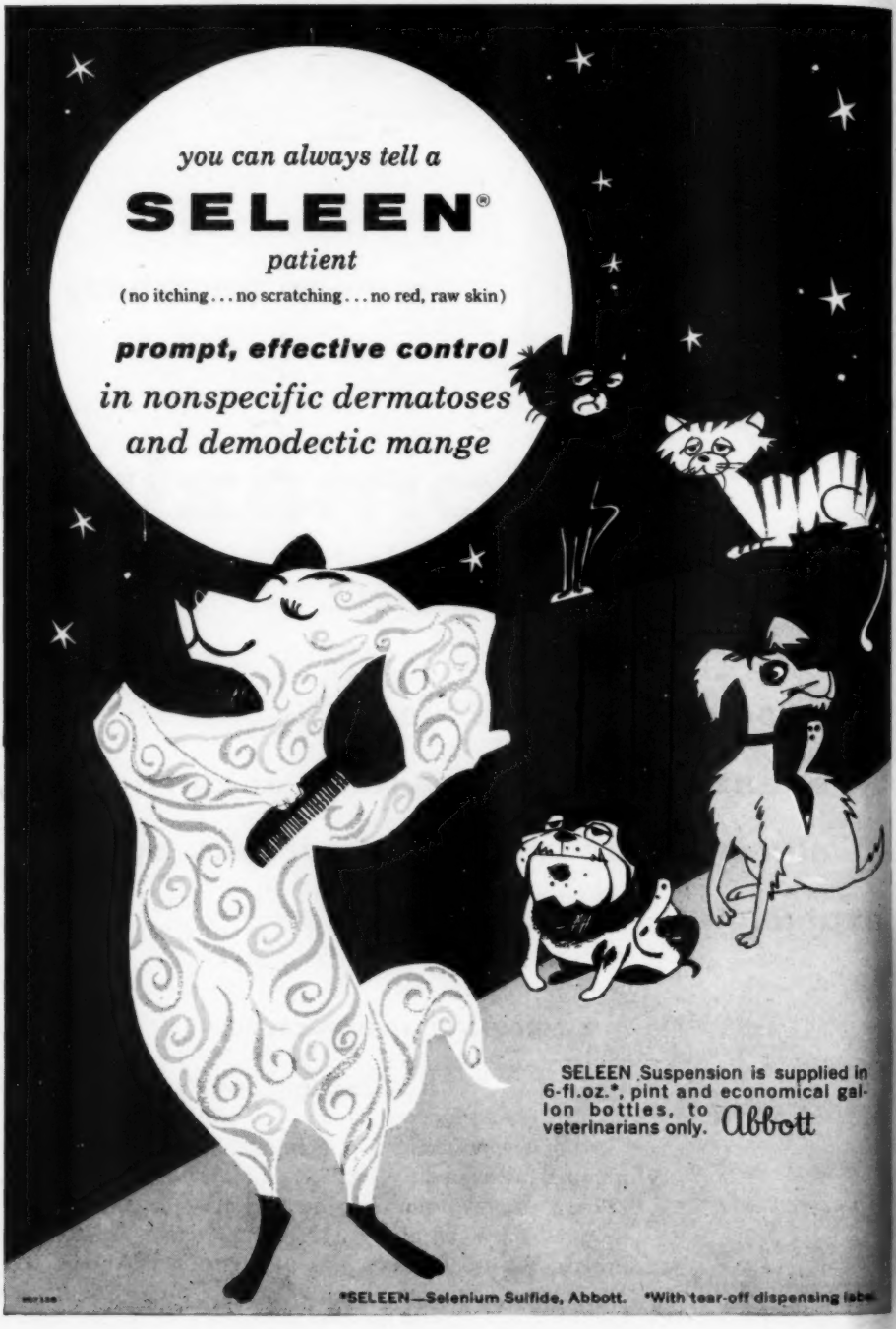
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Extensive experimentation with organic phosphates as systemic insecticides is being pursued at experiment stations in all parts of the country. Some of these compounds appear to have potential as broad-spectrum anthelmintics for ruminants. Herein the authors outline the anthelmintic activity of Bayer 21/199 as a preliminary report.

An Anthelmintic for Cattle and Sheep

Critical Tests of Efficacy of Bayer 21/199

HARRY HERLICH, M.S., and DALE A. PORTER, Sc.D.

Regional Animal Disease Research Laboratory
Agricultural Research Service, USDA
Auburn, Alabama

EXTENSIVE investigations have been, and are being, conducted on the use of organic phosphorous compounds for the control of insects affecting plants and animals. One such compound, O,O-dimethyl O-2,4,5-trichlorophenyl phosphorothioate (Dow ET-57), when administered orally to cattle, is an effective systemic parasiticide for the control of grubs.[1-4] The material has been evaluated as an anthelmintic for cattle[5] and found to have considerable activity against certain species of nematode parasites of the gastrointestinal tract; however, the drug was not as efficient as phenothiazine, especially as it failed almost completely to remove the small hair worm, *Trichostrongylus axei.*

Another thiophosphate, O,O-diethyl O-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate (Bayer 21/199) has shown promise as a grub control agent by systemic action when sprayed onto cattle.[6] It also is active against horse strongyle larvae in feces.[7] In view of the foregoing facts, tests were conducted to determine whether Bayer 21/199 had *in vivo* activity against roundworms parasitic in the gastrointestinal tracts of cattle and sheep. The results of these tests are reported here.

Procedure

Using the technic described by Swanson *et al.*,[8] the drug was critically tested in nine grade Jersey calves ranging from seven to 11½ months of age and in four grade Southdown lambs from four to five months of age. All nine calves and two of the lambs had been naturally parasitized, whereas the remaining two lambs had been reared free of helminth parasites in concrete-floored pens and later experimentally infected with *Haemonchus contortus* and *Trichostrongylus colubriformis.* All animals were slaughtered three to five days after treatment, and the worms still present were recovered for enumeration by the technics described by Porter[9] and Herlich.[10]

Two preparations of Bayer 21/199 were used in the trials: (1) A 50% wettable powder, and (2) a 25% wettable powder. Each animal to be tested was removed from pasture or pen and placed in a stanchion in a concrete-floored barn 72 hours prior to treatment. This was done to allow the parasites and their hosts to adjust to environmental and nutritional variations. Each animal was weighed immediately prior to treatment to preclude weight changes due to food and water intake and excretion of urine and feces. The drug was administered as an oral drench, with no effort being made to effect closure of the esophageal groove.

It had been reported[11] that 50 mg. of Bayer 21/199 per kilogram of liveweight caused the death of a yearling Hereford heifer, whereas 25 mg./kg. did not affect a similar heifer; consequently, the drug was administered in the critical tests as follows: 25 mg./kg. to four calves and three lambs, 12.5 mg./kg. to four calves and one lamb, and 6.25 mg./kg. to one calf.

In addition to the critical tests, six naturally parasitized two-year-old grade Jersey steers were administered the 25% wettable powder, three at a rate of 25 mg./kg. and three at 12.5 mg./kg. Four naturally parasitized adult sheep, including a ram and three pregnant ewes, were also treated with the same preparation; however, three were administered 15 mg./kg., whereas the fourth was administered 20 mg./kg. These animals were all allowed to continue grazing after treatment, and the effect of the drug on the parasites was determined on the basis of fecal egg counts made before and after the treatment. The effect of the drug on the hosts was adjudged on the basis of weight performance and general appearances.

Results

Critical Tests: Cattle. Table 1 shows the numbers and species of worms expelled in the feces and of those recovered from the gastrointestinal tract of each calf at autopsy. Also included in the table is the efficacy (percent of total worm burden that was passed in the feces) of the drug against each species of nematode. Two values of the efficacy of the drug against the individual species were calculated on the basis of; (1) total number of worms recovered from washings and digesta of each portion of the alimentary canal, and (2) the number of worms recovered from washings plus only adult worms recovered from digesta. As can be seen in the table, calculation of the efficacy in this way may result in two extremely different values, particularly in reference to *Ostertagia ostertagi*, a species with a rather extensive tissue phase of development. For example, the drug was either 7.0 or 92.1% effective against this species in calf 1497, depending on whether or not one considers the 18,300 fourth-stage worms which were recovered from the digesta. By the usual postmortem procedures, most, if not all, of these tissue phase worms would have been unaccounted for; consequently, it is, therefore, essential that one make a clear distinction between worms in the lumen and worms in the tissues when evaluating the efficiency of a drug as an anthelmintic.

As is clearly shown in table 1, at the three different dosages used in these tests, the drug was extremely effective against *Cooperia punctata, C. pectinata, Haemonchus placei,* and *Oesophagostomum radiatum.* When consideration of efficacy is limited to adult and immature worms recovered from the abomasal lumen, Bayer 21/199 was most efficient against *Ostertagia ostertagi* at 25 mg/kg., with a rather abrupt reduction of efficiency at the two lower dosage levels. Against *T. axei,* the drug was highly and equally efficient at 25 and 12.5 mg./kg., but considerably less effective at 6.25 mg./kg. Its action against *Bunostomum phlebotomum* and *Nematodirus helvetianus* was erratic; however, only a few animals harbored these two species and only in small numbers.

In addition to the data contained in table 1, calves 1485 and 1522 harbored 80 and 75 *T. colubriformis,* respectively, at postmortem, and apparently no worms of this species were expelled in the feces. The latter calf passed one immature specimen of Capillaria sp. in the feces, and none were present in the calf at autopsy. Four and

TABLE 1. The Efficacy of Bayer 21/199 Administered to Nine Calves

Calf No.	Weight (lb.)	Dosage rate (mg./kg.)	Total amount of drug (gm.)	Worms eliminated after treatment: H.p.	O.o	T.a.	C.p.	C.pe.	N.h.	O.r.	B.p.	Trichuris sp.
1497*	380	25.0	4.30	303	1,391	7,475	3,472	0	0	145	0	0
1520*	210	25.0	2.30	4,055	1,811	213	37,981	0	0	880	19	0
1516**	175	25.0	2.00	4,682	1,975	8,415	78,842	0	0	2,348	0	21
1510**	310	25.0	3.60	1,196	3,111	6,893	112,608	4,759	122	4,610	0	3
1505*	142	12.5	0.80	0	4,247	26,777	10,160	0	141	0	0	4
1485*	346	12.5	1.95	15	2,878	6,274	5,001	0	2,100	4	0	5
1514**	310	12.5	1.80	0	8,657	4,196	15,305	0	0	916	5	0
1522**	290	12.5	1.70	516	2,351	1,433	71,196	3,096	0	1,202	0	0
1517**	290	6.25	0.85	895	1,037	3,517	16,896	150	0	0	0	0
				Worms recovered at necropsy								
1497 a				0	18,420	1,800	0	0	0	0	0	0
b				0	120	0	0	0	0	0	0	0
1520 a				0	90	0	0	0	0	0	169	0
b				0	30	0	0	0	0	0	169	0
1516 a				0	120	0	0	0	180	0	180	1
b				0	0	0	0	0	180	0	180	1
1510 a				0	930	105	0	0	75	0	52	0
b				0	90	60	0	0	75	0	52	0
1505 a				0	2,520	1,080	0	0	180	0	0	0
b				0	2,160	1,080	0	0	180	0	0	0
1485 a				0	4,590	300	0	0	160	0	0	0
b				0	190	300	0	0	160	0	0	0
1514 a				0	5,905	395	0	0	0	0	0	0
b				0	2,855	395	0	0	0	0	0	0
1522 a				0	840	150	50	0	0	0	1	0
b				0	510	90	50	0	0	0	1	0
1517 a				0	1,015	1,220	0	0	0	2	10	0
b				0	615	1,170	0	0	0	2	10	0
				Percentage of efficacy								
1497 c				100	7.0	80.6	100	—	—	100	—	—
d				100	92.1	100.0	100	—	—	100	—	—
1520 c				100	95.3	100.0	100	—	—	100	10.0	—
d				100	98.3	100.0	100	—	—	100	10.0	—
1516 c				100	94.3	100.0	100	—	0	100	0	95.4
d				100	100.0	100.0	100	—	0	100	0	95.4
1510 c				100	77.0	98.5	100	100	61.9	100	0	100.0
d				100	97.2	99.8	100	100	61.9	100	0	100.0
Average efficacy			c	100	29.8	92.4	100	100	32.4	100	4.7	96.0
for all 4 calves			d	100	97.2	99.7	100	100	32.4	100	4.7	96.0
1505 c				100	62.8	96.1	100	—	43.9	100	—	100
d				100	66.3	96.1	100	—	43.9	100	—	100
1485 c				100	38.5	95.4	100	—	92.9	100	—	100
d				100	93.8	95.4	100	—	92.9	100	—	100
1514 c				100	59.5	91.4	100	—	—	100	100	—
d				100	75.2	91.4	100	—	—	100	100	—
1522 c				100	73.7	90.5	99.9	100	—	100	0	—
d				100	82.2	94.1	99.9	100	—	100	0	—
Average efficacy			c	100	56.7	95.3	99.9+	100	86.8	100	83.3	100
for all 4 calves			d	100	76.0	95.4	99.9+	100	86.8	100	83.3	100
1517 c				100	50.5	74.0	100	—	—	98.7	0	—
d				100	62.8	75.0	100	—	—	98.7	0	—

* 50% wettable powder; ** 25% wettable powder.

H.p. = *Haemonchus placei*; O.o. = *Ostertagia ostertagi*; T.a. = *Trichostrongylus axei*; C.p. = *Cooperia punctata*; C.pe. = *C. pectinata*; N.h. = *Nematodirus helvetianus*; O.r. = *Oesophagostomum radiatum*; B.p. = *Bunostomum phlebotomum*.

a = Total number worms recovered. b = Worms recovered from washings plus adults from digesta of organs. c = Efficacy calculated on basis of "a." d = Efficacy calculated on basis of "b."

six *Moniezia benedeni* were found in calves 1510 and 1517, respectively, at autopsy. No tapeworms were passed after treatment.

The drug acted rapidly; nearly all of those worms passed in the feces were expelled within 48 hours after treatment. Almost all worms passed in the feces were adult or fifth-stage worms, although a small number of fourth-stage Trichostrongylus sp. and a somewhat greater number of fourth-stage *O. radiatum* were also expelled.

Apparently Bayer 21/199 caused an abnormal softening of the feces and, in some cases, diarrhea during the first 24 to 72 hours after treatment. Coincident with this condition, there was evidence of listlessness, inappetence, lacrimation, and salivation; however, the symptoms were transitory in every case. Postmortem examination of the gastrointestinal tracts, livers, lungs, and kidneys revealed no gross pathological alterations.

Pasture Test: Cattle. Pretreatment fecal examinations revealed that the six adult steers on pasture were all passing 30 or fewer nematode eggs per gram of feces (e.p.g.); the eggs resembled those of Cooperia spp., Ostertagia spp., and Trichostrongylus spp. Examination of feces collected five and 12 days after treatment failed to reveal a single egg from any of the steers. Weights were not affected, and there was no evidence of any of the disorders described for the calves used in the critical tests.

Critical Tests: Sheep. Table 2 contains the data pertinent to the critical tests conducted on sheep. Unfortunately, with the exception of *T. colubriformis* in two lambs, the number of worms harbored was small. However, at 25 mg./kg. the drug was as active against *H. contortus, O. circumcincta, T. axei, T. colubriformis,* and *C. curticei* as it had been against the same or related species in the calves. In addition, Bayer 21/199 caused the expulsion of all the *Strongyloides papillosus* present in one lamb. At 12.5 mg./kg. the drug maintained its high efficiency against *H. contortus, O. circumcincta,* and *T. axei,* but lost some of its effectiveness against *T. colubriformis* and *S. papillosus.* No worms were recovered by digestion of the gastrointestinal tracts of any of the lambs.

As was the case with the calves, nearly all the worms that were expelled were passed within 48 hours after treatment. The symptoms described for the calves were also noted in the lambs, but to a lesser degree, as they manifested themselves about 12 hours after treatment and then disappeared about 12 hours later.

TABLE 2. The Efficacy of Bayer 21/199 Administered to Lambs

Lamb No.	Weight (lb.)	Dosage rate (mg./kg.)	Total amount of drug (gm.)	Worms eliminated after treatment							
				H.c.	O.c.	T.a.	T.c.	C.c.	N.sp.	S.p.	Trichuris sp.
15*	72	25.0	0.82	140	0	0	22,816	0	0	0	0
18*	58	25.0	0.66	58	0	0	21,250	0	0	0	0
M-1**	58	25.0	0.66	60	48	144	816	264	24	588	0
M-2**	60	12.5	0.35	20	12	12	276	0	0	120	1
				Worms recoverd at necropsy							
15				0	0	0	420	0	0	0	0
18				0	0	0	150	0	0	0	0
M-1				0	0	0	0	0	45	0	0
M-2				0	15	0	276	0	120	30	0
				Percentage of efficacy							
15				100	—	—	98.2	—	—	—	—
18				100	—	—	94.9	—	—	—	—
M-1				100	100	100	100.0	100	34.8	100	—
Average efficacy for 3 lambs				100	100	100	98.7	100	34.8	100	—
M-2				100	44.4	100	83.4	—	0	80	100

* 50% wettable powder; ** 25% wettable powder.
H.c. = *Haemonchus contortus;* O.c. = *Ostertagia circumcincta;* T.a. = *Trichostrongylus axei;* T.c. = *T. colubriformis;* C.c. = *Cooperia curticei;* N. sp. = *Nematodirus* sp.; S.p. = *Strongyloides papillosus.*

Pasture Test: Sheep. The adult sheep also apparently harbored low numbers of trichostrongyles as pretreatment fecal examinations revealed egg counts of fewer than 120 e.p.g. In addition, the adult sheep were also passing eggs of *S. papillosus* and Capillaria sp. Forty-eight hours after treatment, fecal examinations for nematode eggs were negative and remained so for 22 days, when one adult sheep showed a count of two *S. papillosus* e.p.g. One week later, a second sheep had a count of two e.p.g., the eggs resembling those of Trichostrongylus spp. Since the prepatent periods of *S. papillosus* and of Trichostrongylus spp. are shorter than 30 days, reappearance of these eggs may have been the result of reinfection following treatment. Weights of the adult sheep were unaffected, and no untoward effects were observed.

Discussion

The results of these tests indicate that Bayer 21/199 has a broader spectrum of highly efficient therapeutic activity against the nematodes parasitic in the gastrointestinal tracts of cattle and sheep than any other chemical agent hitherto investigated. Its efficacy is equal to or greater than that of phenothiazine against Haemonchus spp., Ostertagia spp., Trichostrongylus spp., and *O. radiatum*, and, like phenothiazine, Bayer 21/199 is effective without prior efforts to stimulate closure of the esophageal groove. Moreover, Bayer 21/199 is extremely active against Cooperia spp., Trichuris spp., and *S. papillosus*, three genera of nematodes that are completely resistant, or nearly so, to phenothiazine. Piperazine citrate[13] and 1:8 dihydroxyanthraquinone[15] have been shown to be active against Cooperia spp. in cattle, and the latter compound was also effective against Trichuris spp. in sheep;[14] however, both drugs had variable effects on Haemonchus spp. and little or no effect on Trichostrongylus spp. in cattle and sheep.[12-14]

To the authors' knowledge, this is the first experimental evidence of highly effective anthelmintic activity resulting from a single oral administration of a drug against any species of Strongyloides. It has been purported[17] that 3,3' diethylthiadicarbocyanine iodide (dithiazanine) is active against *S. ratti*; however, experimental data confirming this have not been published. Gentian violet is somewhat active against *S. stercoralis*, but usually requires repeated administration to achieve a high degree of efficacy. Also, insofar as the authors are aware, the apparent activity of Bayer 21/199 on Capillaria sp. is unique and suggests a possible application for the drug in poultry which may be severely affected by nematodes belonging to this genus.

Mild symptoms of poisoning noted in the calves and lambs that were used for the critical tests were similar to those reported by Radeleff *et al.*,[11] who worked with seven different organic phosphorous compounds. According to those authors, the symptoms were associated directly with the destruction of or interference with cholinesterase. It is interesting to speculate, therefore, on the mechanism by which Bayer 21/199 acted on the nematodes. As is the case with mammals, it appears that the lethal effects of phosphorous compounds on insects is bound up with activity against the enzyme controlling acetylcholine. It has been shown[18] that the lethal action of O,O-diethyl-O-p-nitrophenyl thiophosphate (parathion) on eggs of *Musca domestica* is coincident with the appearance (at five hours after egg deposition) and subsequent rise in acetylcholine content of the eggs. Also, cholinesterase could not be detected in eggs treated with parathion, whereas activity of this enzyme was detected five hours after egg deposition, and activity increased continuously until emergence from untreated eggs. According to von Brand,[19] there is some doubt as to whether cholinesterase occurs in nematodes. In view of the lethal action displayed by Bayer 21/199 against a great variety of nematodes, it would appear that this constitutes indirect evidence that cholinesterase does occur in nematodes, or that the toxic effect of the drug on the nematodes is of a completely different nature.

It is also interesting to speculate as to whether the action of the drug is by direct contact with the worms or *via* the circulatory system of the host. Press preparations of fresh abomasal tissue from one lamb re-

vealed only live, highly active fourth-stage *O. circumcincta*, and live fourth-stage *O. ostertagi* and Trichostrongylus sp. were recovered from the digesta of abomasa of several of the treated calves. Since some fourth-stage Trichostrongylus sp. and fairly large numbers of fourth-stage *O. radiatum* were apparently killed by the drug and passed in the feces, it would appear that the action of the drug was directly against the worms in the lumen rather than through the circulatory system.

Further research with Bayer 21/199 is indicated before it can be broadly recommended for use as an anthelmintic for cattle and sheep because this drug like other organic phosphates affects the parasympathetic nervous system. Nonetheless, it is evident that Bayer 21/199 may be a superior therapeutic anthelmintic to phenothiazine because of (1) its broader, more highly efficient spectrum of activity, and (2) the small quantities of material required per treatment. A further advantage is the absence of any staining of hides or fleece such as that accompanying administration of phenothiazine. Its single, most obvious disadvantage is its potential toxicity; however, the fact that symptoms were mild and transitory, when present, suggests that the drug is reasonably safe when administered to cattle and sheep at a dose of 12.5 to 25 mg./kg. of liveweight. Since limited results indicated that 15 and 20 mg./kg. of Bayer 21/199 were quite efficacious in adult sheep, it is possible that further investigations will show that maximum efficacy may be achieved in both cattle and sheep at a level of administration somewhere between 12.5 and 25 mg./kg.

Summary

Bayer 21/199, O,O-diethyl O-(3-chloro-4-methyl-7-coumarinyl) phosphorothioate, was tested for anthelmintic activity in cattle and sheep. Critical tests and limited pasture tests indicated that when administered at 25 mg./kg. of liveweight, the material was highly efficient against species of the genera Haemonchus, Ostertagia, Trichostrongylus, Cooperia, Trichuris, and Capillaria and *Strongyloides papillosus*. Its effectiveness against Nematodirus spp. and *Bunostomum phlebotomum* was erratic and generally unsatisfactory. Although symptoms indicating some intoxication were noted in the animals used in the critical tests, the disorders were mild and transitory, and the absence of any harmful effects in animals used for the pasture trials suggests that the drug might prove therapeutically useful in dosages not exceeding 25 mg. or less/kg. of liveweight. The chemical is not recommended as a treatment for the removal of nematodes from ruminants until its safety can be confirmed by further trials.

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Gut Edema in Pigs

Hydrocortisone and Combined Hydrocortisone and Sulfonamide for Treatment

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IN A SURVEY of the literature on hydrocortisone, no reference can be found of its use in the treatment of gut edema in pigs. Recently field tests were conducted to determine the usefulness of this versatile product. Earlier investigations have indicated that hydrocortisone reduces development of edema and damage from various toxins.[1]

Materials and Methods

Only positively affected pigs were treated. A total of 17 animals ranging in age from seven days to ten weeks were included in the studies. Five of these were treated with hydrocortisone and a sulfonamide solution (5% sulfamethazine, 5% sulfamerazine solution). Hydrocortisone was administered subcutaneously or intramuscularly in an amount of 50 to 100 mg. Sulfonamide solution was injected intraperitoneally. In all cases except one, a single injection was made. Pigs were treated as soon as possible after onset of the disease. Death may occur in only four to five hours after the first symptoms appear, emphasizing that treatment must not be delayed. Pigs in convulsions, lame, or moribund were not treated.

Results

Case 1. On Sept. 22, 1956, 11 seven-day-old pigs were presented for treatment. All suffered diarrhea and initial symptoms of gut edema. Each received 3 cc. of sulfonamide solution intraperitoneally and a teaspoonful of the same preparation orally.

Three days later, one pig died and on Sept. 29, another pig was seriously ill. A reddish-blue discoloration was observed on the belly and legs. Hydrocortisone (50 mg.) was administered subcutaneously. The remaining nine pigs appeared to be in good health. Treated animal appeared improved within 24 hours and recovered completely in two days. No further outbreaks occurred in this litter.

Case 2. On Oct. 18, 1956, a ten-week-old pig with edema in the eyelids, a staggering gait, a hoarse grunt, and diarrhea was observed. Hydrocortisone (75 mg.) was injected subcutaneously immediately. Appetite improved by the following day at which time second injection of 50 mg. hydrocortisone was given. Recovery was progressive and prompt.

Case 3. On Dec. 1, 1956, three pigs nine weeks-of-age exhibiting typical symptoms of gut edema were attended. One was lame in the hind legs and could not gain its feet. Two pigs had a staggering gait and edema of the eyelids. Each was injected 100 mg. of hydrocortisone intramuscularly. Sick animals were isolated.

The next day treated animals were improved and had begun to eat. The paretic regained its feet and had quite a good appetite. Within a few days all had made uneventful recoveries.

TABLE 1.

Drove	No. pigs	Age (wk.)	Treatment: Cortisone (mg.)	Treatment: Sulfonamide prep. (cc.)	Died	Recov.
1.	1	1	50	3	0	1.
2	1	10	75+50		0	1
3	1	10	50		1	0
4	3	9	100		0	3
5	1	9	100		1	0
6	1	8	100	20	0	1
7	1	8	100		0	1
8	3	8	100		2	1
9	1	6	75	20	0	1
10	1	8	100	20	1	0
11	1	8	100		1	0
12	1	6	50		0	1
13	1	7	75	15	0	1
Total	17				6	11

Case 4. On Jan. 4, 1957, one eight-week-old pig exhibiting typical symptoms of gut edema was examined. On Jan. 2 this pig was treated prophylactically with an intraperitoneal injection of sulfonamide solution (20 cc.). Recovery occurred promptly following injection of 100 mg. hydrocortisone subcutaneously.

Case 5. On March 1, 1957, three eight-week-old pigs were injected with hydrocortisone (100 mg. subcutaneously). The following day two succumbed; the remaining one recovered slowly.

Case 6. On March 21, 1957 a suspected case for gut edema was observed in a six-week-old pig. Sulfonamide solution (20 cc.) was administered intraperitoneally. No improvement was evident on the second day and 75 mg. of hydrocortisone was injected intramuscularly. There was now a distinct edema in the eyelids. During the first days appetite improved, but the pig slept nearly all the time. After five days, recovery appeared complete.

Discussion and Conclusion

As noted in table 1, 12 pigs have been treated with hydrocortisone, five of which succumbed. Recovery experience was 58%. Others were treated with hydrocortisone and sulfonamide solution. Only one of this group died; recovery experience was 80%. These are too few cases to make a final conclusion, but it would appear that they have value above those of other treatment experiences.

An earlier report of treatment with a sulfonamide solution alone gave a recovery experience of 65%.[1] Of particular interest is that pigs treated with hydrocortisone showed a rapid increase in the appetite, and convalescent time was reduced.

In recent years research workers have found hemolytic Gram-negative coli bacteria in the intestine of all pigs affected with gut edema.[2,3] This appears to justify that toxins from these bacteria may be directly responsible for symptoms. Hydrocortisone reduces damage from several toxins. Sulfonamide injected intraperitoneally will effect reduction in the bacterial flora of the intestinal tract, and deter development of toxins.

On the basis of these results, a rational treatment for gut edema should include a combination of these agents.

Summary

The paper describes the treatment of gut edema in pigs with hydrocortisone comparing hydrocortisone and 5% sulfamethazine 5% sulfamerazine solution. Hydrocortisone was administered subcutaneously and intramuscularly in an amount of 50 mg. to 100 mg. to 8-10-week-old pigs. Sulfonamide solution was injected intraperitoneally, 1 cc. per lb. of body weight. The writer supposes that the most rational therapy is to use both drugs.

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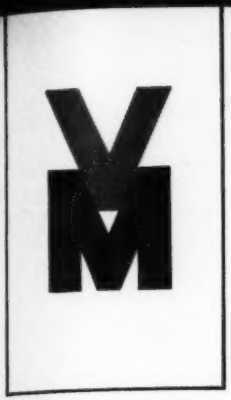
Imports of New Zealand Cattle Industry

Effects of beef and cattle imports from New Zealand will be the concern of western cattlemen's associations during coming weeks.

Dressed beef has arrived in part of the Pacific Northwest for distribution in both the United States and Canada. Price is reported approximately 10 cents per pound below market of native carcasses. Facilities are being readied in San Diego, Calif. for receipt of live cattle which will be consigned to feed lots after the required 30-day corral quarantine.



Mastitis, traumatic gastritis, and displacement of the abomasum are the three most important disease conditions of dairy cattle. This report considers common aspects of these problems.

Dairy Practice Problems

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FROM the standpoint of occurrence and difficulty in handling, three of the most important disease conditions of Michigan dairy cows are mastitis, traumatic gastritis, and displacement of the abomasum. Some facts concerning each of these may add to information already available, or emphasize facts now accepted.

Mastitis

My remarks will be confined to the diagnosis and control of this most common ailment of dairy cows. Veterinarians should be prepared since they are well qualified for the diagnosis of mastitis. Dairymen, however, are practicing mastitis treatment as well as treatment for other diseases. Recent developments in drug supplementation of feeds are reported to be effective in prevention or control of a number of animal diseases. There is, however, no substitute for an accurate diagnosis which usually involves laboratory work. The only way to detect all cases of udder infection is by bacteriological examination of milk samples. There are numerous mastitis tests, but none other than cultural procedures and microscopic examination will detect all cases of infectious mastitis. If one embarks on a control program, it is imperative to know the exact status of each cow in the herd. This will involve detection of subclinical cases, *i.e.*, those harboring harmful organisms but not exhibiting any gross signs of disease. These occult cases present great potential hazard.

The Hotis test, leukocyte count, bromothymol blue tests, chloride test, catalase test, California mastitis test (CMT) and many others all give false negative and false positive readings on many occasions.

Many practitioners in areas of extensive dairying are now doing their own laboratory work for mastitis diagnosis. Some perform sensitivity tests on stubborn cases that do not respond to ordinary treatments. A few of these men have hired, and others are contemplating acquiring services of a medical technician to conduct mastitis diagnostic

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work as well as handle other laboratory procedures, drug preparation and office work. This has made possible in some instances relief from many of the time-consuming tasks for expansion of practice.

Equipment necessary to conduct mastitis diagnostic work need not be expensive. One will need an incubator which can be improvised from an old ice box or worn out refrigerator by placing in it an electric light bulb and suitable thermostat. Additional equipment needed includes a microscope equipped with an oil immersion objective, apparatus for staining slides, glass slides and cork stoppered sterile vials. If one is to conduct sensitivity tests, prepared plates can be purchased or media can be made and poured in the practitioner's laboratory. Sensitivity discs now available make sensitivity testing a rather simple procedure.

Control Program

The first prerequisite in a control program is the cooperation of the owner. Not every dairy farmer wants a control program. Unless he has a sincere desire to prevent and control mastitis, a satisfactory program can not be worked out. Actually, a large part of the program is preventive medicine. Often this is difficult to appreciate. As long as cow's udders are apparently doing all right it is difficult to get the owner to do anything about preventive testing. Nevertheless, the dairyman who realizes just how much mastitis costs him each year is usually willing to talk about prevention. The swine grower who knows how much cholera can cost him is extremely willing to spend a little money on prevention. There is equal good sense in nominal expenditures for prevention of mastitis. The practitioner ought to impress his dairyman client with the importance of prevention. Workers[1] in New York maintain that a control program can save the dairyman an average of $40. per cow per year.

Before beginning a control program, it is necessary to enlist the full-hearted support of the owner and make sure that he understands the following: (1) The necessity of following recommendations explicitly; (2) that treatment alone will not control mastitis; (3) that good milking practices must be followed religiously; (4) that some of the old chronic cases will probably have to be removed from the herd; (5) that even in the best programs not every case of mastitis can be prevented; (6) that a herd negative status will require from two to five months.

In the loose-housing system of management, special attention should be given to the cows with chronic mastitis since they may be among the first animals to come through the milking parlor and thus serve as a great potential danger to the cows following them.

In cases of mastitis that do not respond to antibiotic therapy, one may be dealing with a fungus infection. The best way to propagate a case of mycotic mastitis is to repeatedly infuse antibiotics into the udder.

Traumatic Gastritis

The most valuable element of a metal detector is the good impression its use makes on the livestock owner. For the diagnosis of a penetrating foreign body, the metal detector has no value. Granted, if used correctly, and if there are no nearby interfering metallic objects, the metal detector can tell whether or not there is a metallic object in the reticulum or rumen, but it can not tell whether said object is doing any harm. Many cases of acute mastitis give positive findings on the metal detector, however do not make a diagnosis of traumatic gastritis until the mastitis is resolved and/or other substantiating evidences of traumatic gastritis are found.

The high value placed on today's dairy cows coupled with the fact that modern surgery is a relatively safe procedure, is sufficient justification for exploratory laparotomies and rumenotomies. Obviously one should not depend on exploratory rumenotomy as the only diagnostic procedure employed, and thereby performed promiscuously. We have found that in subacute and chronic cases a fair percentage of the animals failed to give definite indications of harboring a penetrating foreign body.

Permanent magnets, given by mouth and allowed to remain in the reticulum has decreased the incidence of traumatic gastritis in herds where it has been used. The magnet probably has no value in cases where a foreign body is already penetrating, but it can serve to prevent loose-lying metallic objects from penetrating the walls of the reticulum. Muffly's magnetic retriever is useful in retrieving these magnets which can then be freed of attached objects and re-administered.

Displacement of the Abomasum

Fixation of the rumen to the anterior floor of the peritoneal cavity as a stop-gap in preventing recurrence of a displaced abomasum is now accomplished routinely. We employ the method described by Hansen[2] and coworkers wherein a U-stitch of synthetic suture material is begun from within the rumen, is passed through the rumen and floor of the abdominal wall and tied on the outside. The stitch spans a distance of approximately four inches, (anteriorly-posteriorly) and is started immediately behind the xiphoid cartilage. We remove the suture on the fourth or fifth day.

In 1956, E. Liptak, a senior student, devised a diagnostic procedure which is a great aid in determining the abnormal position of the abomasum. This procedure which we now refer to as the Liptak test, consists of an exploratory puncture through the abdominal wall with a three or four inch, 16- or 18-gauge hypodermic needle, aspiration of fluid from the organ penetrated and determining whether the fluid is acid or alkaline with the use of nitrazine* paper (similar to litmus paper). The test punctures (or puncture) are made on the left side of the animal rather low in the area visualized as being occupied by the abomasum when it is displaced. If fluid is aspirated from the abomasum it will have a definite acid reaction as indicated by the yellow color of the nitrazine paper. On the other hand, if the abomasum is not there and if material is aspirated from the rumen it will have an alkaline reaction as indicated by the blue color of the nitrazine paper. If only gas is obtained from the test puncture, it is probably from the abomasum. With a low puncture, should the rumen be penetrated, contents would usually be liquid or solid.

Auscultation can be of value in diagnosing a displacement of the abomasum. Sounds emitted from the abomasum are similar to those heard in man's stomach, especially when a little gas is present. Someone has described them as sounding like sipping buttermilk through a straw. The greatest pitfall is that one may have to listen for periods up to five minutes before being able to detect any of the abomasal sounds.

*Nitrazine paper — purchased from E. R. Squibb & Sons, has a pH range of 4.5 to 7.5.

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Brucellosis Control Program in California

Ten years ago California reported Brucella infection rate of approximately 17% in dairy and 7% in beef cattle. Present incidence based on blood test experience is estimated at 2% in dairy and 1% in beef cattle, an envious disease control record of achievement.

Credit for results is given the calf vaccination program. Practicing veterinarians are authorized to render this service free to owners. More than 3,000,000 calves have been vaccinated during the past ten years.

Twenty nine counties now are pursuing modified accredited status; two have qualified as modified accredited Brucella free areas having reduced infection rate to below 1% in less than 5% of herds.

Antibiotic Sensitivity Tests of Mastitis Causing Bacteria

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WORK IN THE MASTITIS LABORATORY of Michigan State University during the past year, included antibiotic sensitivity tests on organisms associated with bovine mastitis. Represented are infectious organisms from samples of the University herd, ambulatory clients, and from practitioners.

Satisfactory tests require a reliably collected milk sample. Milk is streaked on a 5% blood tryptose agar plate which is incubated 15 to 24 hours at 37 C. The desired colony is then selected and spread over a second plate with either a sterile swab, or by pouring a 1 cc. suspension of the colony made with sterile distilled water on the plate for a uniform seeding.

A tablet* or disc containing a small amount of each antibiotic is placed on the plate which is then incubated at 37 C. Readings are made after 24 hours incubation.

To evaluate the results, observe the zone of inhibition around each antibiotic tablet. If bacterial organisms grow right up to the tablet, there is little hope for that particular antibiotic inhibiting the specific organism *in vivo*. However, the size of the zone is not so important. Diffusion abilities of each antibiotic vary on these plates, and in reality, there is an "all or none" principle involved when reading the test. The resistant column in the table (see table 1) is of greatest significance.

A recent comparison[1] of the commercially available products for carrying out sensitivity tests indicates that the most reliable are the low unitage tablets. Several different antibiotic test discs are used for each test and when there is no zone of inhibition, the organism is considered resistant to that antibiotic. There is a tendency to consider the largest zone as highly sensitive and lesser as moderate, thus explaining so many listed as moderate.

The results of the last 100 individual milk samples cultured to isolate causative agents for mastitis are presented in part A table 1. These results are tabulated without respect to genus and species. Tetracyclines, streptomycin and penicillin appeared to be the most efficient of the antibiotics used singly. Only 24 cultures were resistant to

TABLE 1. Antibiotic Sensitivity of Organisms in 100 Milk Samples from Cows with Mastitis, and of Isolated Streptococcus and Staphylococcus Organisms

Antibiotic	Highly sensitive	Moderately sensitive	Resistant	*Percent effectiveness
Part A—All Mastitis Organisms				
Penicillin	48	28	24	76
Bacitracin	8	44	37	51
Streptomycin	26	48	25	74
Chloromycetin	4	37	34	54
Chlortetracycline	8	56	21	75
Oxytetracycline	35	40	24	76
Novobiocin	8	36	40	52
Spec. Formula 17900	38	21	8	88
Part B—Streptococcus Organisms				
Penicillin	27	8	3	92
Bacitracin	5	17	14	61
Streptomycin	7	20	7	80
Chloromycetin	1	20	10	68
Chlortetracycline	4	28	3	91
Oxytetracycline	17	16	4	89
Novobiocin	1	18	16	54
Spec. Formula 17900	12	6	1	94
Part C—Staphylococcus Organisms				
Penicillin	20	10	4	88
Bacitracin	2	18	12	61
Streptomycin	14	14	8	79
Chloromycetin	1	17	13	51
Chlortetracycline	3	24	6	82
Oxytetracycline	9	21	5	86
Novobiocin	7	17	9	72
Spec. Formula 17900	18	8	2	92

*Derived by combining figures of highly sensitive and moderate and dividing sum by the total trials.

*Dia-Discs, Reed and Carnick, Jersey City, N. J.

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oxytetracycline, 25 to streptomycin, and 24 to penicillin. The greatest number of resistant organisms were noted with test tablets of bacitracin, chloramphenicol, and novobiocin. Tests of Special Formula 17900** (Upjohn) indicated only eight resistant organisms.

Part B of table 1 gives the results of checking only streptococcic-caused mastitis against various antibiotics. Penicillin, chlortetracycline and oxytetracycline appeared to be the most efficient of the single antibiotics. Only three, three and four organisms, respectively, were resistant to the above-mentioned antibiotics. Chloromycetin (Parke-Davis) novobiocin and bacitracin showed the least activity.

Part C of the table illustrates results with staphylococcal mastitis organisms. Streptomycin, penicillin and oxytetracycline showed the most activity. Of the seven antibiotics used the greatest number of organisms were resistant to Chloromycetin. It was also noted frequently that when organisms were sensitive to Chloromycetin and bacitracin they were resistant to other antibiotics.

Pseudomonas, coliforms, and other miscellaneous organisms that cause mastitis are responsible for the difference in totals between parts A and B + C in table 1.

It is interesting to note that only one bacterial organism showed complete resistance to all antibiotics of the potency used in laboratory testing. This was a Pseudomonas organism. Yeasts that were encountered were also resistant.

**Each 10 cc. contains: Hydrocortisone acetate, 20 mg., neomycin sulfate, 250 mg., procaine penicillin, 250,000 units, polymyxin B sulfate, 50,000 units, chlorobutanol, 50 mg.

Summary and Conclusion

Tests on the effectiveness of various antibiotics *in vitro* against bacterial organisms causing mastitis in dairy cows demonstrate considerable variation; however, penicillin, tetracyclines and streptomycin appeared to be the most consistently effective. In these tests the antibiotic combination Special Formula 17900 also was highly effective.

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Occupational Disease of Farmers

The University of Wisconsin Caridopulmonary Research Laboratory reports another ailment peculiar to farmers. It is not "silo-fillers" disease which is due to nitrogen dioxide poisoning. The "new" disease is said to result from inhaling mold dusts — the latter specifically unidentified at this time. Symptoms in afflicted individuals include shortness of breath, cough, fever, chills, weight loss, and blood stained sputum. Lung tissues are reported to be chronically inflamed and thickened. The onset of the condition is rapid — 24 to 48 hours is the incubation period. Virus pneumonia or pneumonia due to other infections have been eliminated. Those cases that do clear up promptly have almost a complete exacerbation of symptoms when again exposed to mold contaminated farm dusts. Hypersensitivity once established probably never is resolved.

Equine Encephalomyelitis Carriers

The *Am. Jour. Public Health* (Mar. 1958) contains a paper by Dr. D. D. Stamm of the Public Health Service regarding the ecology of equine encephalomyelitis. It concerns itself in particular with an effort to cultivate the eastern virus from birds, as well as their immunological reaction. Many birds were found to be carriers of the virus, though not usually transmitters, until some unknown factor disturbs ecologic balance. It is theorized that this disturbed balance could conceivably be due to a great increase in bird population, or possibly the entrance into the transmission cycle of a highly efficient mosquito species so that an equine epizootic results. At any rate with long established centers of bird involvement, ready to explode at any time, there seems little chance of eradicating the disease in horses.—*R. R. Dykstra, D.V.M.*

Promazine

A Clinical Note

A. J. NELSON, D.V.M.

Nashua, Iowa

DURING THE PAST TWO YEARS, the therapeutic usefulness of tranquilizing drugs has become firmly established in the practice of veterinary medicine. Originally developed primarily for the treatment of human patients with neurotic, psychoneurotic or psychotic syndromes, these agents have demonstrated their usefulness for control of hyperexcitable state in animals and as an adjunct to or substitute for physical restraint.[1] There have been several reports in the literature describing the effects of reserpine,[2] meprobamate,[3,4] chlorpromazine,[5,6,7] and promazine.[5,8,9]

Promazine (Sparine®), a member of the phenothiazine series, was used in our clinical trials because it induces a quieting influence without marked hypnosis and its solubility characteristics permit either oral or parenteral administration.

Because at least half of the animals become frightened or alarmed during clipping, we administered oral doses of promazine hydrochloride to 25 dogs on a basis of 1 to 2 mg. per pound of body weight. Response was most satisfying in that clipping time was shortened by one-third and dogs were discharged immediately following clipping. Too, this compound in the same dose was administered to 40 dogs to control barking during boarding and, again, results were entirely satisfactory. Our experience confirms the earlier report of Gradess.[8]

Sparine® is the trade name of Wyeth Laboratories for 10-(r-dimethylamino-n-propyl) phenothiazine hydrochloride.

Use in Swine Practice

In our swine practice, incidence of hysteria in sows at farrowing time is a most disturbing circumstance. Although occurrence is not frequent, its development in well-bred animals is a constant cause for concern. Affected sows may injure, kill and devour their pigs upon delivery, thus loss to the swine raiser is evident. Our former therapeutic program for this condition included the parenteral administration of (a) 2 to 3 cc. of posterior pituitary extract, or of (b) 1/4 to 1/2 gr. morphine sulfate, or of (c) 4 to 8 gr. pentobarbital sodium. Results with each of these agents was disappointing at best.

Kristjansson reported recently on the use of chlorpromazine[10] for the treatment of this syndrome. However, because of the satisfactory results produced by promazine hydrochloride in dogs, it was decided to employ that compound.

Of the first two sows treated, administration of 3 cc. and 4 cc. (150 mg. and 200 mg.) of promazine hydrochloride intramuscularly resulted in each sow's accepting remaining pigs and nursing them. Approximately 20 minutes after injection symptoms of hysteria had disappeared in both animals. Owner reported that sows appeared drowsy for approximately 24 hours.

Nine sows in a herd of 12 exhibited symptoms of hysteria in varying degrees of intensity. Each sow was given 2 cc. (100 mg.) of promazine hydrochloride intramuscularly and, within a few minutes after injection, seven of these animals accepted their pigs. The other two animals in this group did not respond. The lower dose (2 cc.) resulted in little post-injection drowsiness.

Summary

Effectiveness of oral promazine hydrochloride in the control of canine hyperexcitability is substantiated. Nine of 11 sows exhibiting hysteria at farrowing responded favorably to intramuscular administration of promazine hydrochloride in doses of from 100 mg. to 200 mg.

Continued on page 360

In a continuous study extending over four years in 11 dairy herds, no correlation was evident between mastitis infection and total bacterial count. The authors suggest that usual procedures for determination of total bacterial counts of milk may be inadequate for the detection of herd mastitis problems.

Total Bacterial Counts and Their Value in Detection of Herd Mastitis Problems

JOSEPH SIMON, D.V.M., Ph.D., PREDRAG MARTINOVICH, D.V.M. and PHILIP REESE

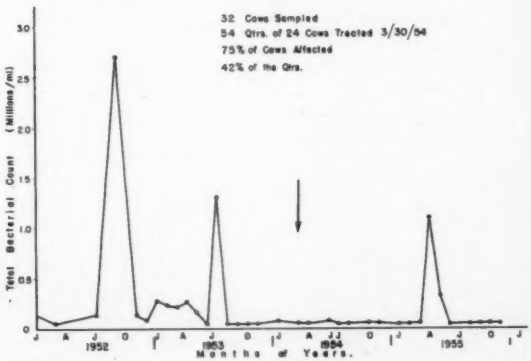
Department of Veterinary Science
University of Wisconsin
and Madison Milk Producers Association
Madison, Wisconsin

IT has been suggested by many sanitarians that high bacterial counts in the absence of obvious sanitary irregularities are indicative of bovine mastitis. It is known that unsatisfactory milking technics as well as poor cooling can contribute to high bacterial counts. These sources of contamination are not often observed since in most milk sheds the inspections are rarely or never made at milking time. This limited report demonstrates the lack of correlation of total bacterial counts and the prevalence of mastitis as determined by laboratory testing of randomly selected herds in which bacterial counts were obtainable.

Background

The herds used in this report were subjected to municipal milk inspection. The total bacterial counts were obtained from the Board of Health. The procedures used for the detection of bovine mastitis were the same as described by Simon and Hall.[1] Unless otherwise stated, the etiologic agents of mastitis in this report were streptococci and staphlococci.

Fig. 1. Three Peaks of Bacterial Counts Occurred During Summer Months. Arrow Indicates Sampling Date.



Published with the approval of the director of the Wisconsin Agricultural Experiment Station as paper NS 220 from the Department of Veterinary Science, University of Wisconsin, Madison.

Fig. 2. This Herd Did Not Manifest a Quality Problem. Arrow Indicates Sampling Date.

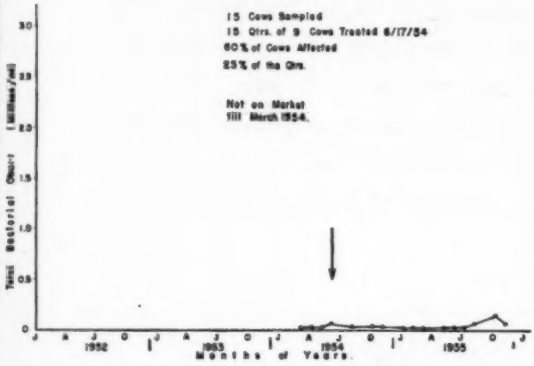


Fig. 3. Although Total Bacterial Counts of Herd Fluctuated, a Quality Problem Was Not Present. Arrow Indicates Sampling Date with Additional Counts Unavailable.

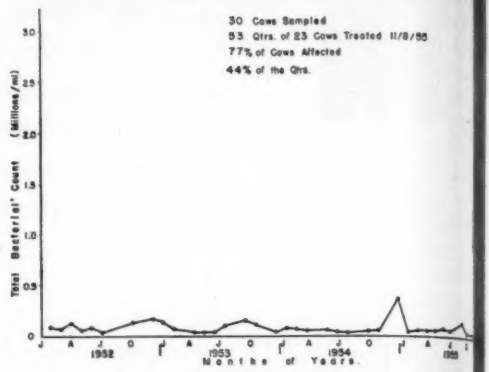


Fig. 4. A Quality Problem Was Not Reported in This Herd. Arrow Indicates Sampling Date.

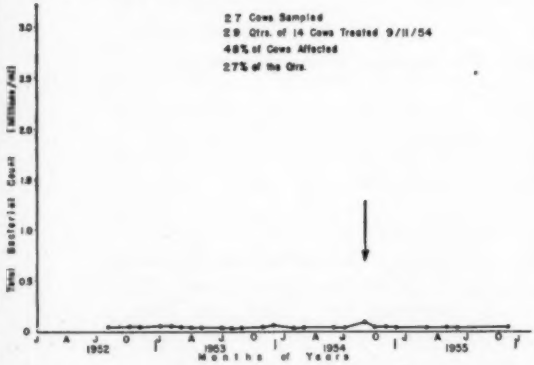


Fig. 5. High Bacterial Counts Were Not Reported in This Herd. Arrow Indicates Sampling Date.

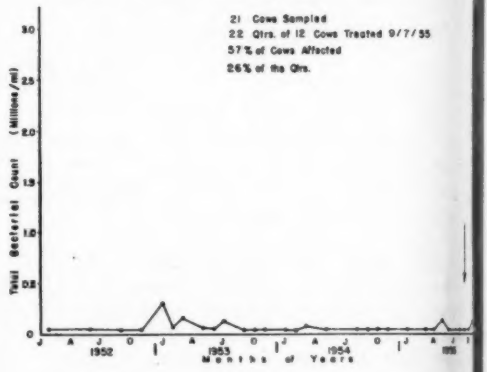


Fig. 6. A Few High Bacterial Counts are Reported with Their Occurrence During Warmer Months. Arrow Indicates Sampling Date.

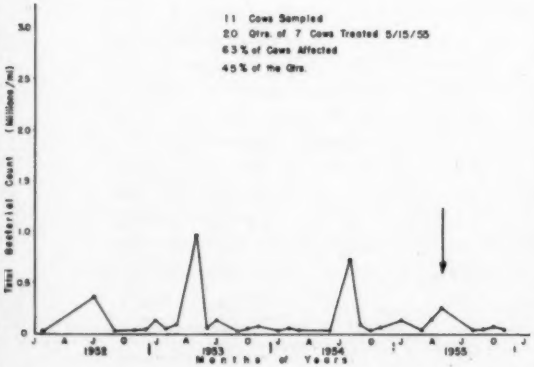
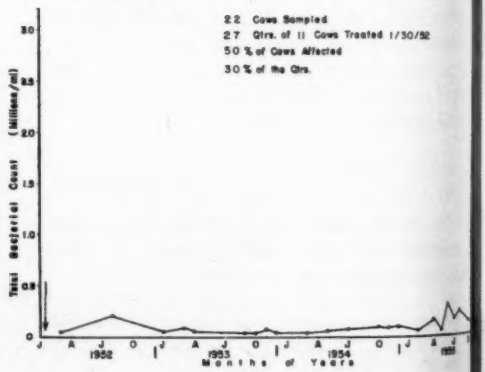


Fig. 7. Herd was Sampled Prior to Procurement of Official Board of Health Bacterial Counts. Slight Fluctuation was Encountered in Subsequent Bacterial Counts. Arrow Indicates Sampling Date.



Figures 1-11 represent the total bacterial counts of the respective herds for a period of years in most cases. Table 1 contains the compiled mastitis data and the official Board of Health bacterial count for the month in which the herd sampling was made. However, the total bacterial count of the mixed milk at the time of mastitis testing is unavailable.

TABLE 1. Composite Mastitis and Bacterial Counts of Herds Used in Study

Herd no.	Cows sampled	Quarters infected	Cows infected (%)	Quarters infected (%)	Official Board of Health bacterial count for the month
1	32	54	75	42	100,000
2	15	15	60	25	<100,000
3	30	53	77	44	<100,000
4	27	29	48	27	100,000
5	21	22	57	26	<100,000
6	11	20	63	45	<300,000
7	22	27	50	30	Unavailable
8	29	25	48	21	<100,000
9	20	19	45	24	<100,000
10	23	24	60	26	<100,000
11	43	97	79	57	< 30,000

It is recognized that the data reported are limited and represent a mere fraction of the total herds sampled over a period of years. However, it can be seen in table 1 that herd 8 with only 21% of the total quarters infected had <100,000 bacteria per ml. of milk as a total bacterial count, whereas herd 11 with 57% of the total quarters infected had a total bacterial count of <30,000 per ml. of milk.

Herd 11 manifested the most unusual mastitis problem encountered in eight years of field work. The abnormal milk obtained from nearly 25% of the infected quarters consisted of a clotted, viscid, stringy, curd-like secretion. Since all milk samples are routinely cultured on blood agar (blood agar base, (Difco), plus 5% citrated bovine blood) it was possible to obtain a sparse bacterial growth characterized by small moist, glistening, mucoid colonies. Smears made directly from incubated Hotis samples revealed an encapsulated Gram negative rod; whereas, the organisms obtained from blood agar plates were non-encapsulated pleomorphic rods. Subsequent studies have

Fig. 8. Two Relatively High Bacterial Counts Occurred During Warmer Months. Arrow Indicates Sampling Date.

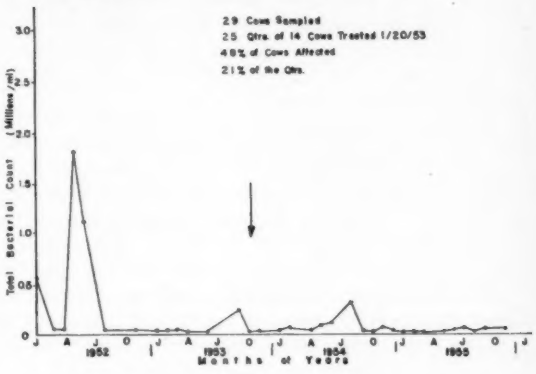


Fig. 9. Two Highest Bacterial Counts Occurred During Colder Months with Two Other Relatively High Counts in Warmer Months. Arrow Indicates Sampling Date.

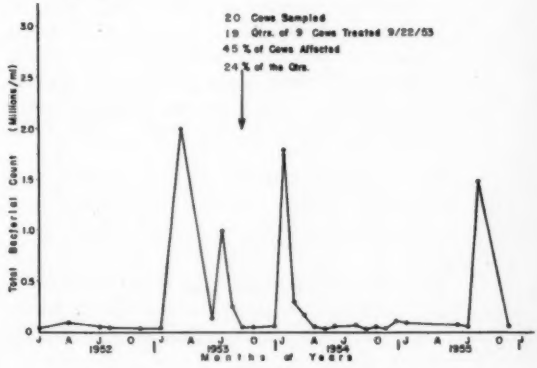
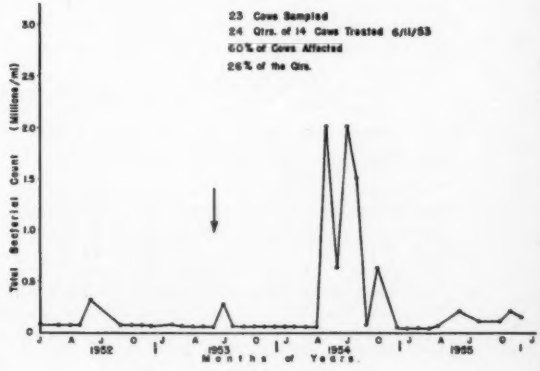


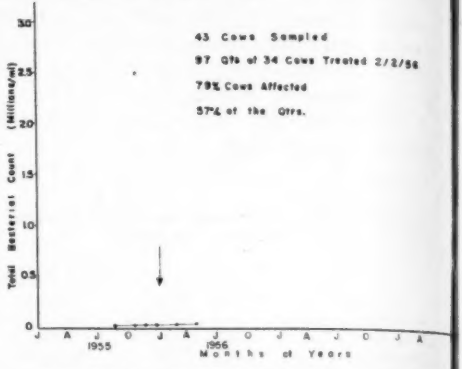
Fig. 10. Highest Bacterial Counts Were Obtained during Warmer Months. Arrow Indicates Sampling Date.



demonstrated the microaerophilic requirements of this unidentified organism. This herd presents a paradox in that 57% of all the quarters were infected and the total bacterial count carried out by routine methods at the time of sampling was <30,000 per ml. of milk.

The data reported suggest that the usual procedures for determination of total bacterial counts of milk may be inadequate for the detection of herd mastitis problems. Certainly, in the 11 herds used in this study, there was no correlation between the prevalence of mastitis and total bacterial counts. However, it is believed that mastitis caused by enteric organisms might provide this correlation. The unusually high bacterial counts shown in figures 1, 6, 8, and 10 were obtained during the summer months. This could be attributed to poor cooling. Many dairymen were not equipped with mechanical cooling, and there was the usual tendency of dairymen during the harvest season to permit haphazard milking procedures with consequent poorer milk quality. The two high counts shown in figure 9 were found in late winter or early spring. An

Fig. 11. This Herd's Bacterial Counts are Paradoxical as Related to the Mastitis Status. Arrow Indicates Sampling Date.



explanation is unavailable though one might speculate that unsanitary milking procedures, dirty equipment or mastitis could be involved.

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Promazine: A Clinical Note

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Key to prevention of milk production losses due to ketosis is early diagnosis and treatment. Clinical experience with Ketotest is outlined.

Diagnosis of Bovine Ketosis

J. ALLYN ROGERS, V.M.D.

Bryn Mawr, Pennsylvania

THE accompanying table illustrates laboratory work performed on milk, plasma, and urine obtained from 18 fresh dairy cows. These cows were of all breeds, high producers, and all had freshened between October 15 and December 15, 1957.

Development of Ketotest* for diagnosis of ketosis was prompted by the veterinarian's need of a more accurate test procedure than the Ross urine test. It's perfection also gave promise of providing cattle owners with a technic that could be used on milk drawn from fresh cows, thus enabling dairymen to detect ketosis at its inception. Armed with such information the dairyman would then be able to call his veterinarian, and appropriate treatment might be started before a complete metabolic breakdown known as acetonemia or ketosis occurred.

Since cost is negligible (1 or 2 cents) for a prepared powder on which is placed a drop or two of milk, owners could be counted on to cooperate. Time required for the test is also nominal and owners can be encouraged to employ it on all fresh cows every two or three days during early lactation. It is a splendid aid in the practice of preventive medicine. Positive reactions are identified before signs of disease are obvious.

The number of methods of treating ketosis is legion. Untreated, recovery occurs by the animal going off feed, thus shutting off milk supply until the blood sugar level adjusts itself, and the concentration of ketones returns to normal. Untreated, it requires approximately 60 days on the average for complete recovery, if animals ever return to the previous normals.

Many treatments do little more than alleviate symptons, and loss of milk production in this country due to ketosis is beyond estimation. Much of this loss can be prevented by early diagnosis and treatment. Ketotest is not only dependable for early diagnosis, but serves as a guide in evaluating response to treatment.

The good dairy cow has inherited an

*The Denver Chemical Mfg. Co., Inc., 35 Commerce Rd., Stamford, Conn.

impetus to produce best early in lactation. It may even be responsible for the cow being sent to slaughter. Therefore, it is recommended that milk be checked the first 30 days of lactation by Ketotest.

I have had veterinarians advise that dairymen will not pay a fee for treatment of a cow which does not look sick. It is unfortunate that they feel this way, because many practitioners have insisted that farmers are anxious to practice preventive medicine. I practiced it happily for 25 years in Pennsylvania.

Reference is made to table 1. Note that five normal cows, numbered 1 to 5, have been fresh from one day to one month. They were not afflicted with retained placenta, mastitis, or other complication at parturition. All dropped normal calves, did not miss a meal, and went to work producing milk. Ketotest on milk and blood plasma of these cows is negative. This opinion is supported by high blood sugars, (normal for dairy cows is considered 50 to 60 mg %) and the low ketones, (normal is considered under 10 mg%). A further check is performed by breaking down the total ketones into the three ketone bodies; namely, acetone, acetoacetic acid, and beta-hydroxy-butyric acid. (Studies by Dalare Associates, Bacteriological and Chemical Research, 2300 Locust St. Philadelphia, Pa.)

The Ross test of urine of these five animals is negative except for number 5. This suggests unreliability of the urine test for ketosis. The only time the urine test is 100% accurate is when it is negative. Urine

TABLE 1. Comparison of Five Tests for Acetonemia or Ketosis, and a Breakdown of Total Ketones to Acetone, Acetoacetic Acid, and B. Hydroxybutyric Acid

Cow no.	Date fresh	Clin. Diag.	Blood sugar (mg.%)	Blood ketones (mg.%)	Aceto-acetic acid (mg.%)	Acetone (mg.%)	B. Hydroxy butyric acid (mg.%)	Ketotest (milk)	Ketotest (blood plasma)	Ross test (urine)
10	3 wk.	Typical ketosis	37	25	6.0	5.5	13.5	2+	4+	4+
11	4 wk.	" "	23	12	3.4	3.3	5.3	2+	3+	4+
12	2 wk.	Severe ketosis	43	27	3.1	7.9	16.0	3+	4+	4+
13	5 da.	Typical ketosis	43	24	1.7	3.3	19.0	3+	3+	4+
14	4 da.	Typical ketosis	46	18	1.3	2.5	14.2	3+	2+	4+
15	6 wk.	Slight ketosis	43	9	0.9	0.2	7.9	Tr.	Tr.	4+
16	1 mo.	Typical ketosis	46	13	2.2	0.3	10.5	Tr.	2+	4+
17	2 wk.	Slight ketosis	46	5	1.7	0.0	3.3	—	—	2+
18	1 mo.	Severe ketosis	25	20	0.8	2.5	16.7	+	3+	4+
8	1 da.	Typical milk fever	65	4	3.4	0.0	0.6	—	—	0
9	2 da.	Severe milk fever	79.8	9	1.4	0.3	7.3	—	—	0
1	10 da.	Normal fresh cow	75.5	3	1.1	0.0	1.9	—	—	—
2	1 da.	Normal fresh cow	55	3	0.9	0.2	1.9	—	—	—
3	2 da.	Normal fresh cow	84	4	1.1	0.0	2.9	—	—	—
4	1 da.	Normal fresh cow	56	2	1.1	0.0	0.9	—	—	—
5	1 mo.	Normal fresh cow	84	5	1.1	0.0	3.9	—	—	2+
6	5 da.	Severe nephritis	51.5	2	0.8	0.0	1.2	—	—	3+ Albumen test
7	1 da.	Retained placenta	40	3	0.6	0.5	1.9	—	—	—

reactions (2+ and 3+) are revealed under some stress conditions.

Cow 6 was suffering from severe nephritis. Urine test disclosed 3+ reaction when tested for albumen. Ketotest of milk and blood plasma was negative. Absence of ketosis as a complication is borne out by a normal blood sugar level and low ketone level.

Cow 7 retained placenta for 24 hours. Ketotest of milk, blood plasma, and urine proved negative, and absence of ketosis was confirmed by normal blood sugar levels, and a low ketone level.

Cows 8 and 9 are milk fever cases. The former, a typical case affected a day after freshening, and the latter, a severe case affected two days after freshening. Because of their recumbent positions, no urine was obtained, but Ketotest on milk and blood plasma was negative. Blood sugar level was within normal range, as it always is in milk fever. Ketones also were within normal range. Never have I found a milk fever case complicated with ketosis; however, starvation during milk fever may often trigger the ketosis complex. All milk fever cases should be checked daily.

Cows 10 to 18 inclusive, were diagnosed as having ketosis. Diagnosis was made prior to taking milk, blood, and urine samples; therefore, before any laboratory findings were known. The laboratory findings on these cows are typical of 2,000 recorded by the writer. (See *Jour. Am. Vet. Med. Assn.*, 131:6 [Sept.] 1957).

In studying the blood sugar and ketone levels of these cows, one should keep in mind that these are not neglected cases. Southern Pennsylvania farmers do not wait for symptoms before seeking professional service. They have learned that it is a good business to treat ketosis early.

Of the nine ketosis cases, only numbers 10, 11, and 18 are below normal for blood sugar, and only numbers 15 and 17 are normal for blood ketones. Both cows were diagnosed as mild cases. Number 15 had a trace reaction on milk Ketotest, suggesting treatment. Number 17 was negative on milk test but gave a positive urine reaction. With blood sugar at 46 mg.% and ketones at 5 mg.%, there is no foundation to base a diagnosis of ketosis.

Both cow number 17 and 5 are good examples of how misleading testing of urine for acetone can be, as concerns diagnosis of ketosis.

Poultry Disease of Unknown Origin

A mysterious disease condition was seen in broiler flocks last year. Most of the reports came from the southeast. While the condition was observed early in the year, incidence increased considerably in the last quarter (October through December). Geographic distribution of affected flocks included Ohio, Indiana, Arkansas, and the Del Mar Virginia peninsula.

The disease was characterized by labored breathing, droopiness, ruffled feathers, and high mortality. Mortality reached as high as 90% of flocks in many cases, with an average death loss of about 60%.

Postmortem findings included excessive fluid in the abdomen and pericardial sac. Subcutaneous edema was also noted. The liver was frequently enlarged and had a rough surface. Kidneys were pale and swollen.

Specific cause of this disorder is still unknown. However, many possibilities have been eliminated and it now appears that a toxic factor in some fatty materials used in these feeds was somehow involved. A report by the Food and Drug Administration indicates that the fatty materials were compounded in part from a black, tarry residue left from fat processing operations.

The American Meat Institute Federation reported that the factor seems to be concentrated in the unsaponifiable fractions of those samples of fat that caused trouble. Preliminary studies indicate that the toxic factor may actually be a mixture of a number of compounds. Pure fat has not been implicated in this problem.

The final answer is not yet known. However, fats which did seem to be involved were withdrawn from the market. The problem has thus been minimized in the field.

As the Internal Revenue Service presses move mechanical equipment into service, the chances of an income tax return audit increases. Here the writer outlines basic procedures of the Service, and explains appropriate action to be taken in case of audit. The author also makes a compelling case for adequate records and stresses the necessity for professional advise in certain cases.

BRING ALL YOUR BOOKS AND RECORDS

ALLAN J. PARKER, B.A., L.L.B., L.L.M.

New York, New York

John A. Brown, D.V.M.,
203 Walnut Street,
Blainsville, Indiana.

Dear Sir:

This will inform you that your individual income tax return for the calendar year 1957 has been selected for investigation. Revenue Agent E. Smith will call upon you on June 30, 1958.

Please have available all your books and records.

Very truly yours,
Robert E. Leigh
District Director of
Internal Revenue

Will you be one of the more than 2,000,000 individual taxpayers who will receive a similar communication from the Internal Revenue Service this year? Every year the chances that your return will be audited increase as additional mechanical and electronic equipment acquired by the Internal Revenue Service releases more revenue agents for field duty. This article will answer some of the questions that arise in connection with the audit of your tax return.

Who is Audited

Perhaps the first question which Doctor Brown asks on receiving the above communication is, "Why me?" Well, in part who is audited is a matter of chance, but not pure chance. First of all, all tax returns are screened for mathematical accuracy. One in four contains an error, according to the Internal Revenue Service, and 90% of these errors favor the taxpayer. Any underpayment of tax thereby discovered is immediately billed to the taxpayer. Overpayments are refunded. A taxpayer has no right to appeal a mere arithmetical error.

Either he is demonstrably right or wrong, and a court has nothing to decide.

On actually investigating the legal and factual accuracy of income tax returns, the Internal Revenue Service makes every effort to audit all individual tax returns showing gross income in excess of $25,000. There are only about 600,000 of these in the whole country each year. In the $15,000. to $25,000. gross income category the policy is to audit as many returns as the work load permits and to screen all returns carefully.

Returns showing a smaller gross income than $15,000. are subjected to a screening process. This simply means that an experienced revenue agent looks for anything on the return that seems out of line, thereby meriting further investigation. For example, suppose young Doctor C. with gross income of $6,100. claims a deduction for "contributions to church — $1,000." He may, of course, be an extremely dedicated churchgoer, but the Internal Revenue Service may well conclude that this return should be checked. Or large entertainment deductions, which may be perfectly acceptable for a salesman, would be questioned on the return of, say, a school teacher. A tax return calling for a large refund increases the likelihood of audit. Finally, of course, there is always the possibility that an audit is brought on by an anonymous letter or phone call from a spiteful neighbor, a disgruntled former employee, or even a dissatisfied client, accusing the taxpayer of cheating on his taxes.

Sometimes the audit will be confined to what is known as a desk audit, wherein the taxpayer is requested to come down to the district director's office with his cancelled checks, frequently those relating only to one or two points which the agent wishes to scrutinize — for example, the $1,000. in charitable contributions claimed by Doctor C above.

Field Audit

For a veterinarian or other professional man, such as Doctor Brown above, the other type of audit, known as a field audit, is more likely. This means that a revenue agent will come to Doctor Brown's office or hospital and ask to see his books and records, and check them against the figures on his return.

"What should I do when the agent comes?" asks Doctor Brown. Generally, the best policy is to cooperate freely with the agent, letting him see your books, bank statements, and cancelled checks. Ordinarily he has a legal right to see all your financial records.

"Should I call in my attorney or accountant?" Again, this depends on the facts of each case.

If you prepared your own tax return and pretty well understand your record-keeping system, it might not be necessary or even particularly desirable to call in outside assistance at this stage. It might only serve to arouse the agent's suspicions if an accountant were at his elbow.

On the other hand, if your return is a particularly complicated one, or your records are in such form that they require a good deal of explanation, professional assistance might be in order. Most important: Before you permit any revenue agent to look at your books and records, ask to see his identification card. If this indicates that he is a "Special Agent" or from the "Intelligence Unit," stop in your tracks! This means that you are being subject to a tax fraud investigation, and you should immediately consult your attorney before the audit proceeds.

It hardly needs to be pointed out that any tax audit will go a lot more smoothly if your books and records are adequate, your deductions are substantiated by cancelled checks, vouchers, or receipts, and as little as possible is left to the agent's acceptance of your oral statements. Sometimes, of course, you have to fill in the gaps. If so, be careful as to what you say. Two or three mistakes in answering questions, and the agent is going to begin to doubt your word on everything.

"Will my return be accepted as filed," asks the doctor. Sometimes, but it's a rare audit that results in no adjustments whatever. The adjustments which agents most commonly make in auditing individual tax

returns generally concern themselves with errors of fact or allocation. For example, the agent in Doctor Brown's audit insisted that an adjustment must be made for allocation of the expenses of upkeep of his home, where only part of the home was used for professional purposes as an office or small animal hospital.

Another frequent adjustment in the case of professional taxpayers such as veterinarians is the erroneous claiming of a bad debt loss on nonpayment of fees. Unless a fee has been taken into income, its nonpayment is not a deductible loss — there simply is no income.

Depreciation is another fruitful source of adjustments, with taxpayers frequently claiming what seems to the agent unreasonably short useful lives for property. Agents are generally unhappy with a useful life of less than ten years assigned to substantial items of veterinary equipment, such as kennel runs or surgical equipment, and also may insist that some consideration must be given to the salvage value at the end of the ten-year period.

Not all adjustments are in the government's favor. The revenue agent informed Doctor C that he had omitted to deduct attorney's fees in connection with one bill for which he reluctantly had to institute suit against a client to collect.

"What about coming to a final settlement of my tax liability with the agent," asks Doctor Brown. The chances of this are good. In fact, most audits result in final settlement of the case then and there with the revenue agent, who proceeds to recompute the tax with the agreed-upon adjustments. The taxpayer simply signs a form and is billed for the additional tax assessment shortly thereafter. By and large, revenue agents themselves prefer to terminate the case at this point.

The Human Factor

Contrary to popular opinion, agents are not judged for promotion on the amount of additional money which they collect for the government but on the speed and efficiency of their audits. For this reason, and also because they are human too, they are not anxious to make a federal case out of every audit. Consequently, they are willing to give the taxpayer the benefit of some pretty substantial doubts on some borderline items if their general impression is that he is honest and not too careless. However, since they are required to write up reports for their superiors, they may be reluctant to settle substantial items simply on the basis of the taxpayer's unsupported say-so. Therefore, on any tax audit, the veterinarian who has taken the trouble to maintain careful and accurate records of his income and expense items will be amply repaid for his modest efforts.

Finally, what happens if you and the revenue agent can not agree on your tax liability? A taxpayer is by no means required to accept the agent's determination as the last word. There are many additional steps before your tax liability becomes final, and these will be discussed in a subsequent article.

Salt Poisoning in Swine

Salt Poisoning in Pigs designates an article by Spriggs that appeared in the *British Veterinary Record* for Mar. 15, 1956. This is report of a research project in which pigs weighing 40 to 60 lb. were fed, varying amounts of salt. The author concluded that for pigs weighing 50 lb. 4 to 8 oz. of salt, without access to unlimited water, is frequently toxic. His general conclusions were that: Large amounts of salt fed suddenly, especially to younger pigs, without access to water, and when animals are compelled to eat heavily salted feed, are most likely to suffer fatal poisoning. The author also indicates that based on the results of his research that the recommendation of some American practitioners for use of heavy doses of salt in the treatment of paratyphoid and hemorrhagic dysentery "would seem to be an unnecessarily hazardous procedure." —*R. R. Dykstra, D.V.M.*

SMALL ANIMAL PRACTICE

How would YOU diagnose this?

CASE NO. 2 Six-year-old female, Dalmatian-English Bulldog cross. Patient limped badly, carried right rear leg gingerly. Right hip joint exhibited pain on palpation. Client stated that patient had been walking cautiously for several weeks.

How would you diagnose and treat this case? Practitioner radiographed the patient. Radiographic findings indicated the source of irritation. For diagnosis and a dramatically successful new treatment regimen, turn to page indicated below.

turn to page XLVII

A consuming practice problem of the small animal specialist is prescription for medical management of aged pets. Ramification of this problem and practical suggestion are discussed in detail.

Geriatrics

ROBERT P. KNOWLES, D.V.M.

Miami, Florida

THE clinician proficient in attending the medical needs of the senile patient approaches the ultimate in the practice of veterinary medicine. Equipment designed for diagnosis makes possible proper and adequate attention to older canine patients. Care of these animals is at the same time rewarding.

Geriatrics represents a special challenge in three separate realms:

1. If the life span of the patient presented is to be prolonged, it can be increased in only one direction. It is true that in modern practice, the canine patient is presented often before birth. This is a tribute to the place that veterinary practitioners have created for themselves in society. It is also true that more intelligent attention is given now to the requirements of patients during all stages of life. It is really in the late stages of this process that the rows get short, the battle becomes difficult and any mistake may be the patient's last.

2. Geriatrics affords a special challenge because senile owners are involved as well as senile patients. The owner and his pet may have identical ailments. On more than one occasion I have launched into an explanation of the whys and wherefores of cataract formation in an elderly dog only to look up into a pair of cataract lenses and see the warm smile of understanding.

It is in the field of geriatrics that a more critical and accurate comparison between the brand of medicine practiced by the veterinarian and by the family physician can be drawn. A senile owner who has been under medication for 15 or 20 years is quick to resent any lack of interest or skill in the attention which his pet receives. The very fact that this owner probably has been on medication of some kind for an indefinite period may complicate successful geriatric attention to his dog. He may take the opposite tack, spurred by resentment of continual reminders, "Now it is time to take your nap, or your pills," and feel that although he himself may be subjected to this kind of attention from his family members, "I will see to it that old Buster here doesn't have to suffer like I do." If the medicine prescribed has an offensive taste or odor, or the regimen prescribed is distasteful or complicated, owners often fail to cooperate. The attitude, "I don't care what the doctor

Presented at the 74th annual meeting of the Indianna Veterinay Medical Association meeting, Indianapolis, Ind., Jan. 15-17, 1958.

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says, I am going to let Buster eat what he wants," is not uncommon.

3. Attempt at care of the aged dog must ultimately fail. Much like a war of attrition, attempts at care of the aged animal are aimed at amelioration and camouflage of symptoms and complaints largely by augmentation and substitution. It is not possible to fully restore sight or hearing or vigor; rather one must be content with an attempt to relieve pain, devise ways to circumvent poor digestion and impaired assimilation, improve appetite and general interest and overcome lethargy and lassitude. It is well to remember that although body functions may decline and diminish with the passage of years, the affection with which this animal is held increases and continues to grow. Although admittedly one can not hope to restore an aged animal to a former prime, if it is possible to improve performances and normal function and make the pet more enjoyable, efforts are amply rewarded.

Reasons for Senility

There are a number of reasons for senility. One of the most important is that in the aged animal, anabolism or cell formation loses out in the contest with catabolism or cellular decomposition. During adult life, these two antagonistic processes are in fine balance, but as senility approaches catabolism becomes more prominent. Senescense appears to be caused partly by changes in the fluid medium in which cells live; for most cells this means interstitial fluid rather than blood. Blood plasma contains both growth promoting and inhibitory substances. The inhibitory substances increases with age and reach high concentration in old age. Heredity may also play a part in aging. The effect of various disease processes and of prolonged normal function of vital organs causes tissue destruction and partial malfunction in old animals. When the essential integrity of the vital organs are interferred with, reciprocal degeneration results.

Another factor which may be overlooked is that old animals simply tire of eating. This may well be a built-in stop gap measure which exerts itself when a certain degree of malfunction arrives. Its cause is not well understood, but it certainly is not to be underestimated as an important factor in bringing on death of the senile patient.

Main Effects of Senility

Heart. Most dramatic organ in the body, the heart, is an organ frequently developing deficiencies in the senile patient and, what is probably more important, deficiencies of the heart are readily apparent to the owner. Practical canine cardiology is, in the opinion of many practitioners, a long way from reality despite the fact that the need for it exists. A careful history and stethoscopic examination of the chest will often reveal to the clinician that some pathological condition exists. In certain cases this pathological alteration, although present, can be ignored for practical reasons. However, when a patient is presented that has a cardiac lesion requiring attention, digitalization can in many cases affect improvement in overall function. There are a number of methods for digitalization of dogs. One of the simplest and most useful is that suggested by Candlin and Phillips: Using digifolin, give 30 mg. per kg. body weight for the first 48 hours. This total dosage is divided into four doses given at 12-hour intervals. After the 48-hour period, give 3 mg. per kg. once daily.

Deficiency. Dietary deficiency is common in the senile patient. Loss of desire to eat, poor digestion and impaired assimilation all make nutritional deficiency likely. It is standard procedure in our practice to administer a multiple vitamin and mineral supplement to all senile patients.

Many of these patients can benefit from a high quality and fairly low quantity protein diet such as k/d (Hill). Dryness of the skin, scratching and tenderness in the kidney area should arouse suspicion of nephritis. Urinalysis and blood urea or blood urea nitrogen determinations may confirm this situation.

Anemia is a frequent accompaniment of nutritional deficiency in aged animals. The advent of a relatively new product which

would seem to be particularly useful in treating senile patients may be of interest. Iron dextran combinations (Armidexan—Armour) for intramuscular injection apparently makes iron available in highly utilizable form. Although experience to date is limited, use of this product has resulted in some interesting hemoglobin rises. Reports of others also suggest usefulness of the product for the aged as well as other selected patients.

Hormones. The theory has been advanced that hormone dysfunction or diminution in hormone secretion may be a vital factor in the aging process. Unquestionably the reduction in the amount of hormones, both male and female, secreted by aged animals have a profound effect on the entire body. Logic would lead to the assumption that a combination of hormones would probably be preferable in the aged animal than a single hormone alone. In practice, such appears to be the case. Fairly recently a product called Anabolin (Warner-Chilcott) was made available to veterinarians. We were privileged to test this product clinically before it was marketed and found it quite an interesting extension of our tools for combating senility. It combines testosterone, estradiol and thyroid. Testosterone is a definitely effective antibolic material. Estradiol although less effective than testosterone, has a synergistic effect when combined with testosterone. The thyroid has been referred to, and quite properly, as the master gland. Thyroid deficiency and obesity, which are almost synonymous, occurs frequently in aged animals. The addition of a small quantity of thyroid extract to the hormones constitutes intelligent therapy. The general effect of this product is to improve interest in life, increase vigor and appetite. Although apparently contradictory, it is none the less true that with adequate dosage, fat dogs tend to lose weight; thin dogs tend to gain weight. In many cases it has apparently helped to promote hair growth and improve muscular tone. An improved formulation is now being tested.

Teeth. Many old dogs have good teeth, but no senile dogs have good teeth. Poor condition of the teeth and gums may be a factor in deterioration of general condition. Removal of all tartar and cleaning the mouth is routine in our practice. This may require a two or three stage procedure.

A detergent stain remover obtainable from any dental supply house is employed after gross removal of deposits. The product used is intended for use on dentures, however. Although bitter it is apparently harmless and will remove almost all stain from teeth. It completes the job of teeth cleaning to the satisfaction of owners. In those cases in which incrustation of tartar has been permitted to accumulate for a long enough period, resulting damage to the gum is treated by periodic use of potassium dicromate. Diochrome (Warren-Teed) has been found useful. This is an astringent and antiseptic and appears to work well in these cases. For home care, particularly in animals that have unhealed tooth sockets and that form tartar excessively, swabbing the mouth from twice daily to once a week is recommended, depending on the circumstances, with one teaspoon of Clorox in a cup of water. This acts as an effective deodorant as well as an agent to discourage bacterial growth.

Minor Problems

Anal Sacs. If the patient has reached the age to qualify as senile and still has anal sacs, they probably will never get bad enough to require surgery. They will, however, be the source of annoyance occasionally. It is good practice to empty the anal sacs every time the patient is presented, and in instances when the amount of discharge is excessive, or seems to be purluent or bloody, it is well to fill sac with antibiotic ointments of choice after expression of contents.

Scaly Elbows. Weladol ointment (Pitman-Moore) has proved useful in general, and particularly in those thickened carpal lesions which are so common in dogs of all ages.

Ears. These organs require considerable attention. The high humidity in the area where we practice predisposes animals to various degrees of irritation and infection

of the ears. This is especially applicable in older animals. We like to clean the ear canal by washing with soap and water using a plastic squeeze bottle and one of the detergents or soaps containing hexachlorophene. We believe this will cleanse the ear canal thoroughly with a minimum of irritation and at the same time help discourage bacterial growth. Four products are employed routinely in treating otitis. If the ear is moist we use a powder (Suloptic—Pitman-Moore) prepared for bovine keratitis. For lesions neither moist or dry, we use one or more of the following, changing agents at regular intervals, depending on response: Aureomycin ointment (American Cyanamid) or a combination such as Metibiotic (Schering). In severe and advance cases that have become chronically indurated, we find coating about every third day, after thorough washing, with Pellene (Pitman-Moore) to be useful. In cases that do not respond to this routine we use either *x*-ray therapy or recommend radical surgery.

Eyes. Chronic purulent conjunctivitis is observed commonly particularly in aged, long haired dogs. Neosporim (Burroughs-Wellcome) is a useful agent packaged for convenient use. Installation of this agent in the eye after thorough cleaning two to four times daily during the acute phase and once daily thereafter has effected good results and pleased owners.

A companion product called Aerodrin (Burroughs-Wellcome) will control chronic sinusitis that occasionally accompanies conjunctivitis. Two or three drops in each nostril one to four times daily is recommended.

General Recommendations

Vitamins. B-complex vitamins should be routinely dispensed for senile patients. Frequently, we fortify such preparations with vitamin B_{12} at the rate 100 micrograms per cc. of complex.

Tranquilizers. Tranquilizers have an important place in veterinary practice, particularly in geriatrics practice. These are given to relieve the stress during simple cleaning operations, examination procedures and sometimes even for the trip from home to the office and return. We have used all or nearly all of the tranquilizers that have been made available. No fatality has resulted even though these agents are administered intravenously frequently. Specific uses for specific tranquilizers have not been completely worked out. In older dogs dosage requirement should be reduced.

Urinary Incontinence. This common condition is a constant source of annoyance to owners. Anabolin is useful in many cases. Estrogen in the female and testosterone in the male have also proved reliable control agents. Induced estrum and restlessness may be induced in females. Nuxergobel (High Chemical) has also served in our practice for those who are not relieved by the usual methods. This product is a combination of herbs containing among other things minute quantities of nux vomica.

Surgical Anesthesia. Selection of an injectable anesthesia for aged patients is most important. A drug is now being tested in our practice that gives promise as a safe agent. Neraval (Schering) is classed as a thiobarbituric acids and has as a primary advantage, short duration of action. If Nembutal (Abbott) is classed as a short acting barbiturate, and Pentothal (Abbott) Suritol (Parke-Davis) and Kemithol (Ft. Dodge) are classed as ultra-short acting, then Neraval will have to be classed as super-ultra short acting barbiturate.

It is an almost invariable practice to administer this agent to effect and leave the syringe in place so that additional quantities can be given in order to maintain the desired state of anesthesia. In approximately 200 cases in which we have used it, and in some of these as many as eight times at short intervals, we have had no fatalities due to anesthesia, have experienced uniformly smooth and quiet recovery, and have been unable clinically to detect any accumulation or increase of susceptibility after repeated injection. Laryngospasm is fairly common. This can be minimized by the preanesthetic administration of atropine. We commonly ignore this side effect and give it without preanesthesia.

Dosage volume is considerably greater than other such injectables. Optimum meth-

od of administration is to give half the contemplated dosage rapidly and then slow down on the remainder. An occasional animal will salivate excessively. A chewing like reaction is common similar to the so-called chewing fit. This is transient and is the only manifestation of an excitation stage.

Advantages are a wide margin of safety and uniformly short recovery period offsetting any disadvantages. It is not uncommon for the animal to be moving the head within ten minutes after accomplishment of surgical anesthesia and 85% of patients will be ambulatory within an hour. We have used the new preparation to induce anesthesia in a variety of surgical situations including *x*-ray therapy, for which we feel it ideally suited, fracture of the jaw, and hysterectomy. Recently we had occasion to use it on a ten-year-old Pekingese suffering a cardiac lesion. The dog had been digitalized for a number of weeks. It was employed to produce anesthesia for enucleation of an eye, six weeks later for hysterectomy. The fact can not be overemphasized that in the old patients cardiac and respiratory depression accompanying surgical anesthesia, if prolonged, are likely to be permanent.

Registry of Veterinary Pathology

In compliance with recent recommendations of the A.V.M.A. Committee on the Registry of Veterinary Pathology, the Armed Forces Institute of Pathology has announced a modified policy regarding the submission of veterinary pathology specimens. After June 30, 1958, animal tissues should be contributed only by or through veterinary pathologists as is the custom with medical and dental case material.

During the development of the Registry of Veterinary Pathology it was essential to accumulate pathologic animal material from veterinary practitioners. In exchange for this material the veterinary section provided diagnostic and consultation services. The many scientific articles, books and study sets inspired by this collection attest to the value of the specimens submitted. The A.F.I.P. provides consultative service in human pathology exclusively through pathologists. The Registry Committee and the A.F.I.P. agree, that in view of the development of veterinary pathology as a recognized specialty and the increasing number of civilian veterinary pathologists, that the time has arrived for veterinary pathology to conform to the pattern followed in human pathology, in so far as contribution of pathologic material is concerned.

Tissues from pathologists should be forwarded to the Armed Forces Institute of Pathology for review and consultation only when they meet the following criteria:

1. When the pathologist believes that the case is a worthwhile contribution to the Registry of Veterinary Pathology for teaching or research.

2. When the Armed Forces Institute of Pathology may provide consultative diagnostic service to the pathologists.

The new policy will permit the Veterinary Section to render more prompt consultative service to pathologists, exercise more selectivity in collecting specimens, utilize the collection for more long range contributions to veterinary pathology, conduct a more intensive training program and permit the assignment of Armed Forces Institute of Pathology veterinary pathologists to military research problems.

Canine Demodectic Mange

Numerous attempts have been made to transfer demodectic mange mites from diseased to susceptible dogs to facilitate study of the life cycle of this parasite. All such attempts have failed. Koutz (*Jour. Am. Vet. Med. Assn.*, 131:45 [July 1], 1957) stated that one study revealed mites in the blood of 20% of infested dogs; yet it is theorized that all infested animals have mites in the blood or lymph at some stage of the disease. It is not uncommon to observe enlarged superficial lymph node associated with advanced demodectic mange.

The author, who is principal laboratory technician of the Department of Surgery, University of California School of Medicine, recounts herein experience with intramuscular injection of Nembutal for premedication and induction of surgical anesthesia in dogs. Though the use of this product intravenously is well established in veterinary practice, and dose can be controlled accurately, routine intramuscular injection is shown also to be useful and quite safe.

Intramuscular Nembutal in Canine Anesthesia

NORMAN BLEICHER, B.S.

University of California
Los Angeles, California

PENTOBARBITAL sodium (Nembutal—Abbott) has been administered by the intramuscular route in the field of human anesthesia for approximately 20 years. Veterinarians and laboratory workers, however, seem reluctant to use this route for animals, preferring intravenous and intraperitoneal administration. Intramuscular use has been avoided because of earlier experience with inflammation and sloughing at the site of injection. However, the veterinary product is now identical to the one prepared for human use, except for concentration of the active agent.[1] Nevertheless, information supplied by the manufacturer does not mention intramuscular administration.

For the past nine months, intramuscular Nembutal has been tested under varying situations for premedication and anesthesia of approximately 100 dogs in the surgical laboratory of the University of California School of Medicine, Los Angeles. Two factors prompted this study. The first was based on the claim that premedication of human patients with Nembutal is equal in effect to premedication with morphine without the side effects of the narcotic.[2] Secondly, the need was felt for a safer method of administering Nembutal anesthesia, especially for use by new and temporary research technicians. In laboratory situations, inexperienced personnel may have a tendency to give intravenous injections too fast. Sufficient time may not be taken to observe the full effects of each fractional amount given. This is especially true if the animal becomes excited during induction. In some animals, due to small size, obesity, or malnutrition, venipuncture is often quite difficult, and repeated attempts tend to excite animals. Intramuscular Nembutal for basal and general anesthesia was found to have a wider margin of safety than an intravenous injection, both when the injection was given with recommended dosages by animal weight or "to effect." Injections can be made quickly and easily. Dosages recommended appeared to have a wide enough margin of safety to allow for most individual

tolerance differences to the drug. Overdosage was rarely observed and, as will be discussed below, could be easily corrected. Technic is easily taught technicians and assistants.

Local Irritation

Local irritation has been observed only when the solution was inadvertently injected along the sciatic nerve. This produced apparent intense pain with local swelling for about 24 hours. If the solution is injected deep into a muscle, there is no evidence of pain or local irritation. We have found that injection into the rectus femoris muscle was the site most preferred by technicians due to easy access and consistent absence of pain. Although the manufacturer suggests that the solution be diluted with an equal amount of distilled water, since some pain may be caused by the alkalinity of the solution,[1] dilution will not alter pH since it is a buffered solution. No problems have occurred in administering up to 8 ml. of the undiluted solution.

Responses were judged to be more uniform to intramuscular injection than to intraperitoneal injection, and the technic simpler. Absorption into the blood stream was more uniform without the possible absorption of part of the anesthetic by the hepaticportal system and its rapid detoxification. There is no chance of injecting the barbiturate into the bladder or other internal organs. The dog is allowed to stand in a natural position and there is easy access to the site of injection.

Dosage for Premedication

In dosages of 20 mg./kg. of body weight, intramuscular Nembutal produces mild sedation in 30 minutes. Dogs are calm and easy to handle. Venipuncture for blood sampling or for administering supplemental anesthetics is well tolerated. Induction of anesthesia with ether is greatly simplified, most dogs exhibiting only a mild excitement phase. The amount of ether required to maintain surgical anesthesia was found to be less than that required with morphine premedication.

Dosage for Basal Anesthesia

Dosages of 30 mg./kg. of body weight produces sleep in 15 minutes with maximum effect in 30 minutes. Ether may be administered with little or no induction excitement, and small amounts are needed to maintain surgical anesthesia. This dosage was found satisfactory for roentgenographic and fluoroscopic examinations. Procedures causing a limited amount of pain are well tolerated. In poor risk patients, some operations may be performed with basal anesthesia supplemented by local anesthetics.

Dosage for General Anesthesia

Satisfactory general anesthesia can be accomplished with 40 mg./kg. of intramuscular Nembutal. Although this is one-third greater than the recommended intravenous dosage, the state of anesthesia produced appears to be the same. The induction stage is smooth. Animals gradually becomes drowsy and lose consciousness in about 15 minutes. There is no excitement stage. There is a gradual increase in anesthetic depth for the next 15 minutes. Surgical anesthesia lasts from one to two hours. Recovery tends to be smooth.

Supplemental Drugs

To inhibit nasopharyngeal secretions, scopolamine should be administered at the time of the injection. It may be given mixed with the pentobarbital sodium solution[2] at an average dosage of 1/100 gr. Although scopolamine itself induces sleep, no need was found to reduce the anesthetic dose. Atropine, having a greater stimulating effect on respiration, may be preferred in poor risk patients.

Neither morphine nor Demerol (Winthrop) need be used for premedication. When preanesthetic medication was found desirable with nervous or unruly dogs a tranquilizer (Paxital—Warner-Chilcott) was employed, administered orally 30 minutes to one hour before injection. Although this drug reportedly has a potentiating ef-

fect on barbiturates,[4] the additional depression was not considered sufficient to warrant a reduction in the anesthetic dosage.

Treatment of Overdosage

Overdosage with intramuscular Nembutal is rare. Aged, anemic and debilitated dogs are most sensitive to barbiturates. Since it is impossible to predetermine the degree of sensitivity, inadvertant overdosage is possible. Overdosage is quickly apparent with intravenous administration, and assisted or artificial respiration must be instituted without delay. Signs of overdosage with intramuscular administration appear slowly, and therefore more time is afforded to institute supportive measures. Ample time may be taken to assure a patent airway afterwhich respiration can be maintained manually or by a mechanical respirator. There is sufficient time to administer analeptics such as picrotoxin or Nikethamide (Upjohn).

With the use of a drug that came to our attention five months ago, the treatment for overdosage has become simple. At the first sign of overdosage, 2-4 ml. (60-120 mg.) of methetharimide (Mikedimide—Parlan) are administered by slow intravenous injection. Within seconds respiration is noticeably improved. The drug is given slowly until the desired effect is achieved.[5] In a few cases additional doses were found advisable at ten minute intervals up to one-half hour.

Summary

Intramuscular administration of Nembutal in canine anesthesia is recommended as being safer and simpler than intravenous or intraperitoneal administration, especially in the hands of inexperienced personnel. Satisfactory dosages were found to be 20 mg./kg. for premedication use, 30 mg./kg. for basal anesthesia, and 40 mg./kg. for general anesthesia. When employed as an anesthetic, opiate premedication is not needed. Overdosage is rare, but is readily detected and may be quickly corrected.

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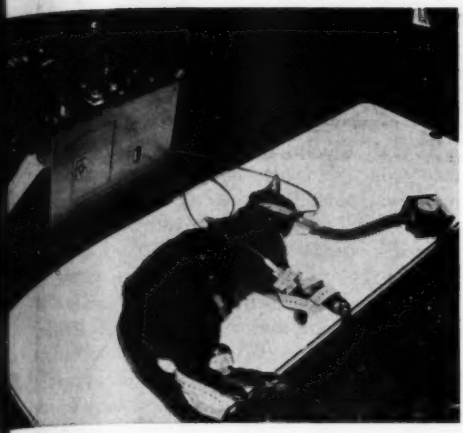
Anesthesia for Small Animals

The October 15, 1957 number of the University of Pennsylvania, Veterinary Extension Quarterly No. 148, includes an article by Dr. Jack O. Knowles, Miami, Florida about small animal anesthesia. This discussion was originally presented at the 57th Annual Conference for Veterinarians, School of Veterinary Medicine, University of Pennsylvania, January 8th and 9th, 1957. At the start of his article Doctor Knowles indicated that barbiturates accidentally introduced into perivenous tissue result in a severe local inflammation with the danger of subsequent slough unless immediately attended. It results from extreme vasoconstriction by the barbiturate. It is explained that much of this reaction may be controlled by infusing the region with a local anesthetic such as 2% procaine.

It is also indicated that pentothal has a strong affinity for adipose tissue and that soon after its administration it settles in body fat. This explains why pentothal is a short acting anesthetic. It is only during the period when contained in the plasma that it anesthetizes. It is eliminated from fat during the following 24-hour period through the kidneys. The importance of the foregoing point is that if pentothal sodium is given repeatedly, fat becomes saturated so that the drug remains in the plasma resulting in a prolonged anesthesia, "many hours or even days." Greyhounds and lean animals in general should, it is advised, be given some other anesthetic than pentothal sodium.—*R. R. Dykstra, D.V.M.*



Illustrating (left) patient under trichlorethylene anesthesia, apparatus and methods for recording electrocardiogram.

Some Effects of Trichlorethylene on the Electrocardiogram of the Cat

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TRICHLORETHYLENE (USP) is employed for induction of analgesia and light plane anesthesia in human medicine.[1] It has also exhibited certain advantages as an anesthetic for dogs,[2] pigs,[3] birds,[3] swine,[4] cattle,[3] cats[3,4] and monkeys.[1] Since trichlorethylene anesthesia in cats is characterized by an easy and rapid induction, it was utilized by us in certain experimental procedures. Because of observed irregularities in the electrocardiograms, it was considered desirable to investigate cardiac activity under trichlorethylene anesthesia.

Investigations were begun during tenure as Public Health Service Research Fellow of the National Heart Institute.

*Trichlorethylene was supplied as Trimar by the Ohio Chemical & Surgical Company, Madison, Wis. and as Trilene by Ayerst Laboratories, New York. The Trimar inhaler was furnished by Ohio Chemical & Surgical Co.

Materials and Methods

In this investigation, 33 cats were anesthetized with trichlorethylene.* Clinically healthy animals were used, except for one animal which exhibited a mild respiratory infection. Their ages varied from about four months to several years. Animals were maintained in deep surgical anesthesia (stage III, plane 3). Duration of anesthesia varied from 22 to 72 minutes, with a usual duration of 30 to 40 minutes. A Trimar inhaler was utilized. Less than 30 ml. of trichlorethylene was required for each animal.

Electrocardiograms were recorded at intervals during the anesthesia. Three standard bipolar limb leads were used with ani-

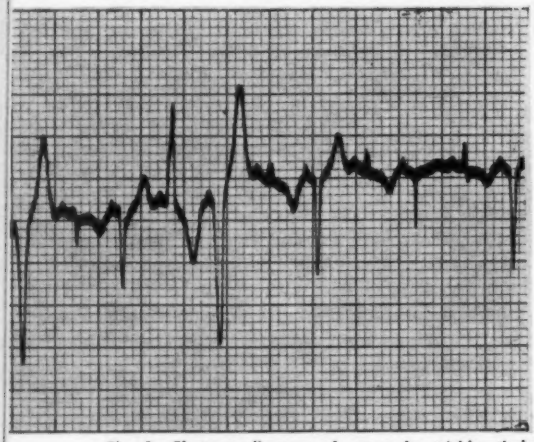

Fig. 1. Electrocardiogram of cat under trichlorethylene anesthesia. (Lead II.)

mals lying on the left side. Electrodes were placed after induction and were removed before recovery was complete. Recordings were made as soon as the electrodes were in place. Subsequent recordings were made whenever changes in cardiac action were observed by palpation and auscultation or at intervals of five minutes. During the course of the anesthesia, the standard leads (lead I, II, III) were usually recorded. In some instances lead II only was recorded (Einthoven's law).[5]

Results and Discussion

When trichlorethylene was used as the anesthetic, abnormalities were observed in all properly recorded electrocardiograms. The development of ectopic ventricular systoles of multifocal origin which occurred in about three-fourths of the cases was the most frequent abnormality observed (fig. 1). Auricular fibrillation was seen in about two-thirds of the patients.

The depth of anesthesia appears to be the determining factor in the appearance of cardiac disturbances. The importance of trichlorethylene concentration in producing cardiac abnormalities has been demonstrated in man[1] and the dog.[6] At higher concentrations, abnormalities are pronounced; at lower concentrations, abnormalities are infrequent.

A description of a typical case illustrates the action of trichlorethylene. A female cat weighing about 3 lb., and about four months of age was given trichlorethylene. No premedication was used; 30 ml. of trichlorethylene was poured into the inhaler. The setting of the inhaler was at "full." Heart rate was 160, with normal rhythm. The mask was placed on the cat, and three minutes later the animal was judged to be at stage III, plane 2. Six minutes after starting anesthesia, with the animal in plane 3, the first electrocardiogram was made. A heart rate of approximately 300, ventricular systoles of multifocal origin, with an intermittent paroxysmal ventricular tachycardia were recorded. This was interpreted to indicate a ventricular pacemaker of multiple origin, and myocardial damage. It was also evidence of an increased irritability of the myocardium. For about 15 minutes the heart action did not change, remaining premonitory to a paroxysm of ventricular tachycardia and fibrillation. Some evidence of auricular fibrillation also was evident in the electrocardiogram. The mask was removed after the animal had been in surgical anesthesia for approximately 50 minutes. One minute afterwards, ectopic ventricular systoles were evident. Some 15 minutes later, while there was a slight auricular fibrillation, only an occasional ventricular ectopic beat developed, and the electrocardiogram approached the normal.

The cardiac action of trichlorethylene suggested two explanations. Either the effect was directly upon the myocardium and conducting mechanism, or to a sensitization of the heart to epinephrine. That there is an increase in sensitivity to epinephrine with trichlorethylene has been demonstrated in the dog.[7] This was also demonstrated in a cat. The animal was anesthetized with ether and the sensitivity of the heart to epinephrine was then assayed. Extraventricular systoles were achieved when 100 micrograms of epinephrine were injected. After approximately 15 minutes, the ether was replaced with trichlorethylene and extrasystoles were obtained when 25 micrograms of epinephrine were injected. There is little doubt that trichlorethylene increases the sensitivity of the heart to epinephrine. If the primary effect of trichlorethylene were

a sensitization of the heart to epinephrine, one would expect the serious cardiac arrhythmias to be developed during induction. However, the arrythmias became more pronounced when the depth of anesthesia was increased, as is the case in man[5] and the dog.[6,7]

Electrocardiograms demonstrated that trichlorethylene produced toxic effects upon the heart. The major effects of this toxicity were reflected particularly upon the ventricular musculature and upon the conducting mechanism. That these effects were the effects of trichlorethylene and not the effects of anesthesia *per se* were demonstrated in a series of trials in which the cats were anesthetized with ether and with thioamylal sodium. In these instances the electrocardiograms were normal. The ether was replaced with trichlorethylene, and electrocardiographic disturbances appeared. As recovery began with thioamylal, trichlorethylene was administered and the abnormalities occurred.

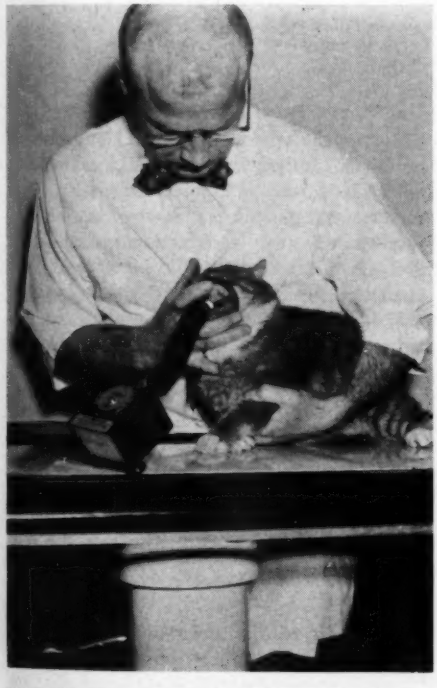

Fig. 2. Induction of cat with trichlorethylene demonstrating minimum restraint required.

Clinical Observations

The major advantages of trichlorethylene in cat anesthesia are easy induction[1], analgesia and lack of objectionable odor of the anesthetic. Induction may be easily accomplished by one person holding the cat with one hand and handling the mask with the other hand (fig. 2).[8] Animals do not seriously resist the mask or anesthetic, even with successive anesthetizations. Analgesia is excellent, allowing brief operative procedures to be carried out before full anesthesia is achieved. During anesthesia unaccompanied by restraint, muscular contractions of the legs may be seen. Normal restraint easily controls these movements.

Tachypnea develops during deep anesthesia. It is important that the anesthetist not confuse it with the stage of light anesthesia seen with other anesthetic agents. During the recovery stages the animal should not be disturbed, for hyperactivity may develop. Recovery is rapid, complete recovery usually occurring within 30 minutes.

Trichlorethylene appears to be a suitable feline anesthetic for operations of short duration. Depth of anesthesia should be kept light to minimize alterations in the electrocardiograms, which although apparently temporary, are not desirable features of an anesthetic.

Summary

Observations on more than 30 cats demonstrated that trichlorethylene altered the normal electrocardiogram of the cat. The effects were those which tended to produce ventricular systoles of ectopic origin, paroxysmal ventricular tachycardia, interference in the conductivity of the heart and auricular fibrillations. Easy induction, excellent analgesia and rapid recovery characterized trichlorethylene anesthesia in the cat.

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Continued on page 382

Tranquilizers have rapidly come into wide use. Studies reported here confirm no adverse effect following use of chlorpromazine.

Chlorpromazine in the Dog

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THIS paper summarizes laboratory studies in animals to determine the toxicity of chlorpromazine and reviews briefly some uses of this versatile agent in veterinary practice to control excitement, relieve vomiting, and lessen shock due to trauma.

Subacute Toxicity Studies

Dogs were given daily subcutaneous injections of 5 mg./kg. of chlorpromazine for one month, and were later subjected to periodic blood, liver and renal function studies. During the observation period of five weeks the dogs appeared well and showed no significant change in body weight. (See table 1.) At the end of the test period, animals were sacrificed by injecting 300 mg. of pentobarbital intraperitoneally and 180 mg. intravenously and subsequently severing the carotid artery and jugular vein.

Histopathological Studies. Sections of the heart, lungs, liver, intestine, stomach, pancreas, spleen, kidneys, adrenals, testes or ovaries, peripheral nerve, brain, and spinal cord were removed and stored in Zenker's fluid for 24 hours, washed with tap water for 24 hours, and then placed in 70% alcohol. These tissues were examined and no evidence of histological damage attributable to the drug was found.

Blood Studies. Weekly hematological examination showed no significant changes indicative of toxic effects in red blood cell count, hematocrit, non-protein nitrogen, total hemoglobin, oxyhemoglobin, and blood coagulation time during the control and test periods.

Liver Function Studies. Table 2 summarizes the results obtained in the dogs, using the bromsulfalein excretion test (B.S.P.), and shows that no significant changes occurred in any of the animals given the

TABLE 1. Subacute Toxicity Studies in Dogs Given Chlorpromazine 5 mg./kg. Subcutaneously for One Month

Dog no.	Sex	Weights (kg.) and Dates 6-4	6-11	6-18	6-25	7-1	7-8
68	M	8.74	9.20	9.76	9.74	9.48	9.78
76	M	7.90	8.10	8.20	8.06	8.02	8.0
23	F	8.72	8.72	8.8	8.66	8.64	8.44
8	F	10.84	11.00	11.2	11.10	10.86	11.00
Control	M	8.6	8.80	8.92	8.97	9.10	9.20

drug throughout the test period.

Renal Function Studies. Weekly creatinine and p-aminohippurate clearance tests revealed no evidence of kidney damage in a trained adult female dog which was given 5 mg./kg. subcutaneously for 30 days. Moyer and associates,[1] in conducting similar studies in nine dogs, anesthetized with pentobarbital, found that 50 mg. of chlorpromazine intravenously caused a slight reduction in blood pressure, but that glomerular filtration rate was not affected, except in one animal, whose rate decreased from 73 to 48 cc./min. when its blood pressure dropped from 136 to 94 mm. Hg. Their findings are listed in table 3.

Chronic Toxicity Studies

Of 28 dogs selected, five received daily oral doses of 10 mg./kg. of chlorpromazine for 90 days; seven, 20 mg./kg.; seven, 30 mg./kg.; and nine served as controls. Blood studies, liver function and renal function studies, and urinalyses were carried out periodically. At the end of the 90-day period, all of the treated and one of the control dogs were sacrificed and sections were prepared for histological examination, in the same manner as described in the subacute studies.

Blood Studies. Semi-monthly determinations of the total number of erythrocytes, leukocytes, differential leukocytic counts, hematocrit, hemoglobin concentration, nonprotein nitrogen, plasma prothrombin time, serum alkaline phosphatase, and blood coagulation time showed no significant changes attributable to chlorpromazine.

Liver Function Studies. Liver function studies (bromsulfalein excretion — BSP) carried out every three weeks indicated normal function throughout the test period.

Liver specimens from the animals showed no allergic reactions or evidence of intrahepatic biliary stasis. Bile canaliculi were free of any inspissated material. No granular bile deposits were found in Kupffer cells or in parenchymatous cells. Biliary radicles in the portals canals showed no epithelial swelling, degenerations, inflammations or bile stasis. The only evidence of necrosis in the parenchyma was due to focal accumulations of minute parasites indigenous to the liver of experimental animals. Viscosity

TABLE 2. Liver Function Studies: B.S.P. Excretion, Expressed as % Retention, in Dogs Given Chlorpromazine (5 mg./kg.,s.c.) for One Month

Dog no.	Control values before test (%)	Values after one week (%)	Values after two weeks (%)	Values after four weeks (%)
68	BSP injected —	—	—	—
	5 min. sample — 30	— 30	— 20	— 20
	30 min. sample — 10	— 0	— 0	— 0
76	BSP injected —	—	—	—
	5 min. sample — 20	— 30	— 30	— 30
	30 min. sample — 10	— 20	— 0	— 10
23	BSP injected —	—	—	—
	5 min. sample — 10	— 20	— 20	— 20
	30 min. sample — 10	— 0	— 0	— 0
8	BSP injected —	—	—	—
	5 min. sample — 50	— 20	— 10	— 20
	30 min. sample — 0	— 0	— 0	— 0

determinations of the bile taken from the sacrificed animals disclosed that both groups of treated dogs had a slightly lower average viscosity than the control animals.

Renal Function Studies. Phenolsulfonphthalein (PSP) test results, summarized in table 4, showed that no impairment of kidney function occurred in dogs given 20 mg./kg. of chlorpromazine. Those given 30 mg./kg experienced a slight, transient decrease in PSP excretion rate, which appeared related to a slight lowering of blood pressure.

Urinalyses. Examinations of the urine for blood, crystals, urobilinogen and albumen, carried out every two weeks, were completely negative.

Pregnancy Studies (Rabbits and Rats). Daily subcutaneous injections of chlorpromazine (5 mg./kg.) in rabbits from early pregnancy to term resulted in no reduction in the number of viable young or survivors. Rats receiving 10 mg./kg. of the drug in feed produced normal litters. The study revealed no discernible toxic effects in dams or in litters carried through three generations.

Uses of Chlorpromazine in Veterinary Practice

Sedation. The selectively inhibitory action of chlorpromazine on the central nervous system makes it an effective agent in calming hard to manage or excited animals without inducing stupor or indifference to feeding schedules. Graves[2] used chlorpromazine in over 100 dogs in a 14-month clinical trial to relieve excitement attendant with the dressing of wounds and minor surgery. He found that this agent, administered in such circumstances, effectively calmed animals in the unfamiliar surroundings of the veterinary hospital or office and made efforts to give medical aid less difficult.

Antiemetic. The early laboratory studies of Courvoisier *et al.*[3] demonstrated the ability of chlorpromazine to block the potent emetic action of apomorphine in dogs. Their findings were subsequently confirmed by Glaviano and Wang[4] who reported that the drug, in subcutaneous doses of 2 mg./kg., raised the threshold of emesis induced by apomorphine approximately tenfold. Further work in dogs by Brand and co-workers[5] showed that chlorpromazine prevented vomiting induced by agents acting on the chemoreceptor trigger zone (morphine, ergot alkaloids, and apomorphine), but failed to alter appreciably vomiting induced by agents acting on the nodose ganglion of the vagus (veratrum alkaloid) or the gastrointestinal tract (copper sulfate, given orally).

Practical application of chlorpromazine as an antiemetic has been reported by a number of investigators. Estrada[6] used the drug successfully in 69 patients to combat

TABLE 3. The Acute Effects of Chlorpromazine (50 mg. Intravenously) on Blood Pressure and Renal Hemodynamics+

Dog Number	Mean Blood Pressure* mm. Hg				Glomerular Filtration Rate cc./min.				Renal Plasma Flow cc./min.				Hematocrit				Weight of dog (kg.)
	C	D_1	D_2	D_3	C	D_1	D_2	D_3	C	D_1	D_2	D_3	C	D_1	D_2	D_3	
1	111	78	84	....	47	48	43	....	149	178	164	....	39	39	38	....	18.5
2	97	103	97	....	45	50	47	....	161	189	173	....	49	51	52	....	20.4
3	114	119	90	....	50	50	51	....	168	171	232	....	40	40	40	....	20.0
4	131	116	94	84	42	37	41	40	114	125	140	141	40	40	41	39	16.4
5	136	116	94	107	73	72	48	56	249	241	230	213	40	40	39	38	21.0
6	123	90	77	93	39	41	37	31	129	144	148	104	43	43	39	38	12.0
7	151	124	112	110	54	52	51	43	105	86	79	71	44	44	44	40	22.8
8	176	146	138	140	24	24	22	21	110	125	129	120	50	50	50	49	14.2
9	133	112	88	90	53	56	58	49	214	212	234	267	45	41	41	41	14.0
Mean	130	112	97	104	47	48	44	40	155	163	170	153	43	43	43	41	17.7

C = Control observations (average of three 10-minute periods).
D_1 = Average of 2 consecutive 10-minute periods taken immediately after chlorpromazine administration.
D_2 = Average of 2 consecutive 10-minute periods taken 60 minutes after chlorpromazine administration.
D_3 = Average of 2 consecutive 10-minute periods taken 90 minutes after chlorpromazine administration.
*Measured by a damped manometer connected through a manifold to an indwelling arterial needle.
+Courtesy of Moyer *et al.*[1] and *Am. Jour. Med. Sci.*

TABLE 4. Phenolsulfonphthalein Kidney Function Test (Percent of Dye Excreted Within One Hour)

Drug	Animal no.	Control values (%)	Values during Test Period (%) Day 15	Day 28	Day 48	Day 85
Chlorpromazine 20 mg./kg. p.o.	8	65	60	55	65	—
	15	70	—	70	65	70
	1a	60	65	50	65	—
	18	65	50	65	65	45*
	30	70	60	75	75	65
	7	75	65	55	55	65
	Average	68	60	62	65	67
Chlorpromazine 30 mg./kg. p.o.	1	65	50	55	35	70
	24	70	45	60	70	70
	19	70	55	65	50	70
	27	75	60	50	40	75
	26	65	35	55	50	60
	Average	69	49	57	49	69
Control	86	65	75	65	60	65
	93	—	75	65	65	60
	80	—	—	50	—	60
	Average	65	75	60	63	62

*Questionable injection of PSP dye.

vomiting resulting from anthelmintics; Troughton *et al.*[7], to control car sickness.

Preanesthesia. Graves[2] used chlorpromazine in single intramuscular doses of 12 mg. and 25 mg. as a preanesthetic agent in 84 surgical procedures. In all cases it had a tranquilizing effect that facilitated administration of the anesthetic. Anesthetic doses were reduced by 20 to 60%. No vomiting occurred and emergence from anesthesia was "invariably quiet." Schmiterlow and Tufvesson[8] had similar success and observed further that the excitement phase of induction frequently encountered with pentobarbital was completely absent.

Traumatic Shock. The effectiveness of chlorpromazine in preventing or treating shock is apparently due to its adrenolytic action, abolishing vasoconstriction and allowing the early passage of blood. Courvoisier *et al.*[3] injected 2 mg./kg. of chlorpromazine in dogs immediately after severe hemorrhage and completely protected them against the shock which caused 85% mortality in untreated controls. Graves[2] administered chlorpromazine to ten dogs involved in accidents in which most of them had sustained fractures. When treated, they were in a state of shock (blanching of mucous membranes, increased and weakened pulse rate, stupor) but were not unconscious or bleeding severely. Chlorpromazine "seemed to nullify the animals' concern with pain. No adverse effects from the drug were noted."

Summary

Results of subacute and chronic toxicity studies in dogs given chlorpromazine revealed no evidence of blood dyscrasia, liver dysfunction, renal blockage, or histopathological damage. Examination of urine for blood, crystals, and urobilinogen was negative. Administration of the drug to rabbits and rats throughout pregnancy resulted in no deleterious effects on the young or dams. Clinical uses of the drug to control excitement and stress, relieve vomiting, and reduce shock due to trauma are reviewed.

Acknowledgment

Special thanks are due Charles F. Branch, M.D. (pathologist) for examining tissues from the animals used in the toxicological studies reported here.

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Cartilage Bank

ROBERT P. KNOWLES, D.V.M.

Miami, Florida

Two METHODS of preserving cartilage for transplantation purposes are available to the veterinary surgeon: (1) The frozen technic, which requires that cartilage be harvested in a sterile manner, wrapped in sterile gauze, placed in a previously sterilized test tube, sealed and stored in a deep freeze until ready for use. (2) The alternate method is the Merthiolate (Lilly) preserved method. When the latter is used the cartilage may be harvested without strict sterile technic. Those portions of dogs' ears exclusive of the heavy cartilage constitute the most useful. From long eared dogs, such as Pointers, Hounds and Cockers, it is possible to obtain sections of tissue up to 2 x 4 in.

The cartilage should be collected immediately after death. All tissues should be removed including skin, muscle, fat and fascia. The remaining cartilage sheet should be thoroughly washed in antiseptic soap to remove hair, et cetera, and placed immediately in a test tube containing a 1:1,000 solution of aqueous Merthiolate. This effectively renders the tissue sterile after storage for a few days. The Merthiolate emersed cartilage tube should be kept under refrigeration, tube should be dated and the solution must be emptied and replaced every two weeks. The solution should be changed 24 hours prior to use. At surgery, the cartilage sheet should be removed from the Merthiolate and allowed to soak in saline while the recipient site is being prepared.

The use of frozen cartilage strips in veterinary surgery has been described by Irwin (VETERINARY MEDICINE, 52:179 [Apr.] 1957). In addition to providing bracing for faulty ears, other uses which suggest themselves are perineal and inguinal hernia, or any defect in the abdominal wall in which there is inadequate tissue for proper and adequate closure. When cartilage sheets, such as those described, are transplanted under these circumstances into defects in the abdominal wall, the cartilage serves to provide a tough, flexible bridge between the edges of the defect.

Although Merthiolate preserved cartilage does not live or continue to function as such, the replacement by host tissue which almost inevitably takes place is a slow process requiring some eight to ten weeks. This reaction by the host tissue is essentially fibroblastic infiltration and replacement of dead cartilage cells with scar tissue formation and occasionally with bone. During the process the cartilage retains its tough characteristics and it would appear represents a more physiological approach to such tissue starved defects than the insertion of tantalum or other mesh and similar appliances.

The work in this field has been done primarily on an experimental basis, however, the results obtained thus far indicate that further consideration should be given this technic in veterinary surgery. It should be noted that sterile precautions are essential in the implantation of cartilage into the host animal and that some serous effusions occur in the area of the transplant as part of the host reaction. A pressure bandage will minimize pocketing.

Presented at the 74th annual meeting of the Indiana Veterinary Medical Association, Indianapolis, Ind., Jan. 15-17, 1958.

Electrocardiogram of the Cat

Continued from page 377

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The veterinary practitioner as a professional man is a major component on the team of health scientists charged with the maintenance of public health.

The Veterinary Practitioner in Public Health

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IN general when the term "public health" is used, one thinks of the human community. Veterinary public health refers to functions of veterinarians in community health programs. Every veterinary practitioner functions in the interest of public health. Career men are not unique individuals who are foresaking their original calling.

Preventive Medicine and Public Health

Preventive medicine as defined by Dr. Hugh Leavell is the science and art of preventing disease, prolonging life and promoting physical and mental health and efficiency. Public health then may be considered a sort of division of preventive medicine, that part which requires organized community effort or action. Much confusion may arise by attempts to differentiate those terms by definitions alone and these attempts may confuse further rather than enlighten. Both the health officer and the private practitioner practice preventive medicine. Their point of view and emphasis differ in many respects. Because it is often less dramatic than medicine or surgery, preventive medicine has not had the appeal for private veterinary practitioners which is warranted, nor has it been given its deserved recognition in medical and veterinary medical education.

In our teaching institutions, we often hear the remark that we are all interested in preventing and controlling disease. And it is probably true that we are. Unfortunately what begins as everyone's business often ends up as no one's business. In our teaching and thinking we must stress the value of preventive medicine.

What then, is a proper concept of the role of the veterinarian in public health?

Presented at the 74th annual meeting of the Indiana Veterinary Medical Association meeting, Indianapolis, Ind., Jan. 15-17, 1958.

First, veterinary medicine has its own public health problems. One usually thinks of this phase of veterinary medicine as regulatory medicine, however in essence it bears the same relationship to the profession that public health does to human medicine. Anyone cognizant of the whole functioning of a complete and efficient human public health enterprise realizes that the entire effort is based on the cooperative team work of many different disciplines. The veterinarian is in a position to be able to contribute much to this team effort to solve human health problems.

There emerges animal public health problems and human public health problems. Animal problems are all intimately related to the human problems as they may affect either the source of food, or serve as a source or reservoir of disease.

The graduate veterinarian may contribute in these organized programs in one of two ways. Either by being a full time or part time health officer in organized regulatory or human public health work or by the contributions he can make as a private practitioner.

Regulatory veterinary medicine or animal public health is expanding its services to the practitioner and is constantly striving to improve in its program of disease control and prevention. It behooves the practitioner to cooperate in every way possible, in brucellosis and tuberculosis testing, in disease investigation, and in disease morbidity and mortality reporting. The first principle of disease control is to establish practical methods for ascertaining their incidence and progress. Organized reporting of animal morbidity and mortality is essential to the development of veterinary public health operations. The organization of a reporting system requires cooperation between all interested agencies and groups and the private practitioner is the key man. In a recent article in a Columbus paper a leading medical profession spokesman said "Doctors themselves must share a good part of the responsibility for the definite trend toward socialized medicine in the United States." This same accusation could be laid at the feet of the veterinary profession. Certain services must be provided, such as mastitis control program, disease eradication programs, better diagnostic facilities. If the practitioners refuse to provide these services, then some other agencies must do so.

Basic Functions

Public health units have seven basic functions: (1) Vital statistics, (2) control of communicable diseases (including zoonoses), (3) environmental sanitation, (4) public health laboratory services, (5) maternal and child health, (6) health education, (7) chronic diseases. In more than half of these functions the veterinarian can play a vital role. He is the only other member of the "team" besides the physician who has sufficiently broad and complete concept of disease to act as the physician's deputy. Too long veterinarians have functioned as "gut puddlers" and garbage can inspectors. They should be utilized more efficiently. Local health officers can broaden the veterinarian's scope of responsibility to include epidemiologic investigations and survey work. More help should be sought from the private practitioner in rabies control programs, disease investigations and morbidity reporting. And where the ability and experience justifies it, the veterinarian can and does function in a broad public health administrative role. Two of the larger cities in Ohio have veterinarians acting as health commissioners.

The present state of world affairs necessitates civil defense forces. Training and experience make the veterinarian well qualified to accept significant responsibilities in this area. This was graphically portrayed in a recent article by Dr. Raymond B. Church describing his experiences during the disasterous floods in New England in 1955 (*Jour. Am. Vet. Med. Assn.*, 128:495 [May 15], 1956.)

Every opportunity must be explored to stimulate the interest of the veterinary profession in the field of preventive medicine and public health. The veterinarian must be alerted to the opportunities available and stimulated to participate in this field.

One of the best places to begin this pro-

cess of alerting the profession is in the veterinary college curriculum. Dean Hagan of Cornell pointed the way when he stated that "the essential job of the veterinary schools is to give a sound, general, basic training in the fundamental sciences which underlie the prevention, control and treatment of animal diseases and then to give some indication to the students of the applications of the education they have received. However, a fair and proportionate share of time must be allowed for the teaching of the basic and applied phases of preventive medicine." This is not intended to mean that each student should be trained so that he might function as a professional health officer upon graduation, but the veterinary practitioner, whether he be public or private must be equipped to take his place in this vital work with practitioners of other professions.

College Training

The veterinary college should not attempt to train graduate students in public health. Our veterinary institutions can not bring together all of the disciplines which form the basic concepts of public health. On a University campus where both a public health and veterinary school are in operation, the situation is ideal for dual cooperative efforts. The public health training offered in a school of public health would be an ideal background for veterinarians engaged in regulatory disease control activities as well as those professionally employed by human public health units.

Veterinarians are urged to participate and cooperate in regulatory and public health functions. This to included acceptance of or seeking membership on local and state health boards by doing as much part time regulatory, meat inspection or other health work as practice would possibly allow, by better education of the general public, and by taking advantage of every opportunity to advance professional prestige.

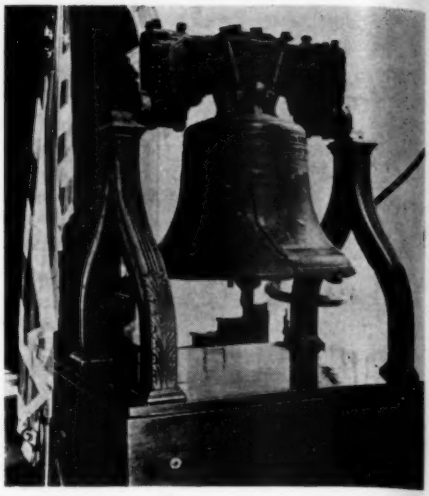
Meetings such as this can do much to bring the veterinary practitioners of public health together, both the public and private. It is said that one reason health department veterinarians often do not support their state association programs is because they feel like an illegitimate child at a family reunion. Some effort should be made to include programing of special interest to this group of public veterinarians as well as pertinent preventive medicine topics for the private practitioner.

By cooperative efforts, local, state, federal and college officials can set up postgraduate seminars and short courses to alert public and private practitioners to new advances or new concepts in the field of preventive medicine. One example of this is a program now being pursued in Ohio. The State Health Department, University, City Health Department and State Department of Agriculture are cooperating in presenting a series of endemiology seminars.

A successful public health program is characterized by the efficiency of the team approach. By cooperative efforts the veterinary profession will continue to make great strides in the prevention and control of both human and animal disease.

Methimazole as a Feed Additive

Literature from various sources indicates that physicians have for some time past been prescribing for the treatment of overactive thyroids (hyperthyroidism) a substance known as methimazole (USP). The substance, 1-methyl-2-mercaptoimidazole, has also been designated Tapazole (Lilly). Some physicians consider it the "antithyroid drug of choice." The significance of the above is that the Iowa State College, and the University of Arizona have recently made tentative and very preliminary — not by any means conclusive — reports in regard to Tapazole as a feed additive for beef cattle. One report has it that when stilbestrol alone stepped up gain 13.8% and feed efficiency 9%, a combination of stilbestrol and Tapazole boosted gains 27% and feed efficiency 17%. Veterinarians will want to be on the outlook for additional reports about feeding tests with this preparation as a new feed additive.



A symbol of the American tradition, the Liberty Bell now stands in the main corridor of Independence Hall. The bell cracked, according to legend, while tolling the death of Chief Justice John Marshall.

A. V. M. A.

To Meet in Philadelphia August 18-26, 1958

In the heart of old Philadelphia, more than elsewhere in America, is the greatest concentration of physical reminders of the American Revolution and the establishment of the United States as a free nation. Familiar to everyone are the three venerable buildings on Independence Square — Independence Hall, Congress Hall, and the Supreme Court Building — and Carpenter's Hall; but there are other reminders of our national beginnings, among them the first bank of the United States, the Bishop White House, the Dilworth-Todd-Moylan House, and the sites of City Tavern and Franklin's home.

These features, and many more, await those who will attend the 95th annual meeting of the American Veterinary Medical Association, Aug. 18-21, 1958 in the City of Friends.

In addition to its many historical attractions, Philadelphia has a fair claim to being "the nation's classroom." Since Colonial days, Americans have been coming to that "ancient" city to attend such institutions as the University of Pennsylvania, oldest of the many educational institutions in the city. It dates its beginnings from 1740 and honors Benjamin Franklin as its founder. Here, where the College of Veterinary Medicine is an integral part of the school, were developed many "firsts" in American science and education.

By any standard, Philadelphia is a great city. It is the biggest in the nation after New York and Chicago, and the center of the nation's oldest industrial area.

William Penn's "green countrie towne" has come a long way in the few centuries since its birth. The small parallelogram, bisected by two wide streets, Broad and Market, with City Hall at their intersection, and with a park at each corner of the rectangle, has been swallowed by this industrial Philadelphia, now growing faster than ever before.

Once "sleepy," Philadelphia now has the nation's fastest-growing port, nipping at New York's heels for total tonage handled. Even skyscrapers are rising like shafts of granite out of the center of the city.

Editorial

The ECONOMIC POSITION of LIVESTOCK GROWERS

The most obvious result of scientific progress during the past 100 years can be illustrated in a simple diagram which divides the working population of the country into two parts: Agricultural and non-agricultural. The decline of farmers has been sharp and steady, but statistics do not tell the whole story. For one thing, persons now engaged in agriculture are becoming increasingly dependent on other sectors of the economy for markets in which to sell and buy.

Shortly after World War I, and again after World War II, the farm economy was faced with a long-term decline in farm prices. As a result of improved technology —coupled with inelastic demand at the consumer level, and high fixed costs at the production level — farm surpluses piled up. Low prices attended a plentiful supply.

Meat Production

During recent months, however, the red meat industry has enjoyed an unusual demand for its products. In spite of mass unemployment in industrial centers, the demand for meat food products has remained good. At the same time, meat for the showcases of grocery counters has been somewhat scarce. Supermarkets have dipped into their frozen meat reserve to fill the demand. At Chicago, prime steers brought $36.50 a hundred, approximately $10. over a year earlier, and the highest level in five years. "In terms of parity, cattlemen got closer to a 'fair' price in January than in any other month since February 1953," according to a report from The Corn Belt Farm Dailies.

Much the same has been true of the hog market, now the highest in four years. In January 1958, hog prices were calculated at 85% of parity; top prices hit $21.65 a hundred in late February.

Lambs, too, reached the highest peak in six years.

The rise in the prices being offered at market can best be illustrated by the following comparison: On the basis of February 1958 prices, a farmer had only to sell 21 hogs at 230 lb. to collect $1,000. Two years earlier it took 35 hogs to bring $1,000.

From a short range point of view, it may be noted that the improved situation is a result of a more favorable balance between supply and demand. But such an analysis tells only part of the story. (See VETERINARY MEDICINE, 53:173 [Apr.], 1958.

Livestock-Agricultural Contrast

Veterinarians have been acutely interested in the status of the livestock industry. They have noted with interest that while products

such as food grain, cotton, feed grain and oil seed have shown increased production of from 46 to 91% during the past ten years, meat food production has increased only 6% during the same period. And yet the meat food industry (for the moment at least) represents one of the few sectors of the economy that is not participating in the current business slump.

Obviously increased production beyond a certain point can lead only to insolvency. Most farm products are faced with inelastic demand at the consumer level. A well-fed population can not greatly increase its consumption of meat food products, even if prices for steaks and pork chops go down. The various phases of the meat food industry have increased efficiency and productivity as a result of scientific progress, but they have not become ensnarled in astronomical surpluses with the resulting decline in income of other farm products (despite parity payments, soil banks and other automatic gyroscopes designed to keep the farm economy on an even keel). The whys and wherefores are not without interest.

Meat food animal production does not have the high fixed costs of some other farm endeavors. Expensive machinery does not stand idle, and farm equipment does not rust away unused in the same degree as in wheat farming. On the other hand, sensational feed additives and growth-promoting tools are used in direct proportion to the number of cattle being fed. As prices go down, producers tend to curtail animal production more than, say, growers of wheat and tobacco. On a long term basis, red meat production more readily adjusts the supply to the effective demand.

Take the price of hogs for instance. When the Korean war broke out, rising prices prompted farmers to turn out a bumper crop of pigs in 1951. When these pigs flooded the market, prices tumbled sharply. As a result pig production in 1952 and 1953 dropped. Consequently prices rose in 1954. Chicago hog prices in 1952-53 averaged around $17. a hundred pounds. A year later they were $25. The $25. price in the winter of 1953-54 — and higher cash returns in 1954 — again prompted a bumper pig crop in 1955. Again history repeated itself. Prices went down in the last half of 1955 and early 1956. The next chapter in the story is now being written, and portion of it appears above.

This is not to say that the problems associated with maintainence of income for producers of meat food animals have been solved, or are automatically solving themselves as a result of the solar system of a free market. Far from it — but the degree of "overproduction" in livestock compared with the "overproduction" in other food and fiber products points with interest to the central economic question; namely, that of high fixed costs and low variable costs which characterize farm production.

Veterinarians have an important role to play in the red meat industry. At the individual level, effective use of scientific methods can give the practitioner's client a differential advantage that does not exist for other producers. Disease patterns in large scale operations have attained consistent proportions, and in a way can be considered a major cost. Their control or elimination can enable the livestock producer to more nearly estimate the cost of producing for the projected market.

Pennsylvania and Delaware Brucellosis Free

The states of Pennsylvania and Delaware were awarded certificates for brucellosis control from the United States Department of Agriculture at the University of Pennsylvania recently. The two states bring to 11 the number of states to be designated Modified Certified Brucellosis Free. Throughout the country 1,020 counties (which include the 11 states) have been so designated. Certificates are awarded to those states which have reduced brucellosis infection to less than 1% of all cattle in the state.

Veterinary Practitioners and Public Policy

An ancient and honored principle of law is that known as "Public Policy." The term itself has been variously defined as being synonymous with the "policy of the law," and is violated when an act "conflicts with morals of the time, and contravenes any established interest of society." Written laws are the highest expression of public policy; but in many instances the Courts are obliged to invoke the abstract principle of public policy in making decisions.

Professional ethics and public policy alike have long declared that any contract which places an agent in a position where the interest of the client conflict with his own or with a third person whom the agent also represents is not in the public interest. The client is entitled to completely disinterested advise and treatment for his animals.

The law has always held the doctor-client relationship to be sacred. Subordination of the patient's welfare to reprehensible contracts or agreements offend the morality of that relationship. Any contract that serves to place a veterinarian under a direct inducement to violate the confidence reposed in him by another is of this character.

The esteem with which the community holds its professional members is in itself important to the standing of that profession. Veterinarians themselves have been great exponents of the premise that veterinary medicine is a profession. If that premise is granted, it is evidently true that anything which has a tendency to lessen the esteem in which the profession is held is against public policy. It is almost impossible to conceive of anything that would debase the profession or undermine confidence in it more than public knowledge of secret rebates.

Application of Knowledge

It has been emphasized repeatedly that though all information concerning mastitis in dairy cows is not known, some pertinent facts are known and can be accepted as truths. It also appears probable that if recommendations for control of mastitis that have been proved sound were universally applied, mastitis would be less of a problem.

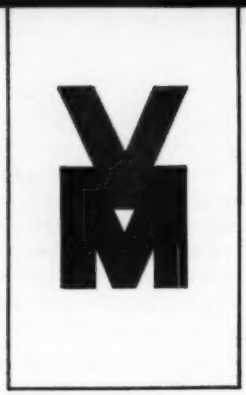
First consideration is that mastitis is a herd problem and should be treated as such. Prevention is the logical approach to control.

Measures for prevention may be grouped in two general categories: (1) Proper milking procedures and (2) good herd management practices. The first involves sanitation and practices that minimize trauma incident to milking. It also involves care of milking equipment. The second consideration begins with raising replacement heifers and includes a long list of what may appear as minutia, including items of equipment and involving details of management. The dairy cow must be recognized as an efficient producer and the udder as a delicate organ.

There is no mastitis specific available now or is there likely to be in the future. Profitable dairy operations are likely to continue to depend on the cooperation of owners with recommendations of qualified veterinarians. These will consider many factors indigenous only to the herd in question.

Frank acknowledgment of wide gaps in knowledge of the subject, but deliberate application of facts that are known, will assure improvement of the present situation concerning mastitis. It is no credit to the dairy industry that this disease continues to rank first among those that ravage dairy cows, considering effective recommendations for its control promulgated by veterinary scientists.

Practitioners are encouraged to emphasize the potential value of a carefully planned program as a continuing effort to minimize staggering losses. Profits for the dairyman above management costs of such a program have been demonstrated repeatedly. This economic fact can be added to the proved scientific facts of mastitis control.



Indiana Report

INDIANA VETERINARY MEDICAL ASSOCIATION

Indianapolis, Indiana

Meetings of the Indiana Veterinary Medical Association have followed a pattern for years that has made possible some perfections in conduct of annual three-day sessions. Meetings during the past several years have been held at the Severin Hotel in Indianapolis at approximately the same dates each January. The cooperation of the hotel management, and of veterinarians in and around Indianapolis who serve as hosts each year, has assured the success of meeting after meeting. Members from all sections of the state appreciate the advantages offered by the accepted pattern and have cooperated with it. Results are apparent in steady growth, advancement and an excellent *espirit de corps* among Indiana veterinarians. Attendence and participation is active and business is conducted with dispatch.

Indiana veterinarians are well organized, and function in a spirit of cooperation in regional and state activities. Through these efforts they have developed admirable relations with the public. Some 130 members served on various committees during the past year and maintained a liasion that served to advance the science and promote cooperative relationships. The voice of the profession through its organization in Indiana is an effective one.

Election of Officers

Constitutional amendment passed at the 1958 session effected the method for election of corporate officers. Henceforth the Executive Board will nominate one or more members for the officers of president-elect, vice-president, secretary, and treasurer. Additional nominations may be made by petition at a specified time prior to the annual meeting. All nominations will be included on ballots to be prepared and mailed to membership in time to be returned before the annual meeting. Results of election will be announced at the opening session of subsequent meeting.

The procedures regarding election of officers that have obtained in the past were exercised this year and resulted in advancement of Dr. R. F. Portman, Lafayette, to president; and election of Dr. L. A. Clark, Bedford, president-elect; Dr. Harry J. Magrane Jr., vice president; and Dr. L. M. Brost, Indianapolis, secretary-treasurer.

President's Address

In his opening address, President Ray W. Worley, South Bend, presented and discussed an organizational chart of the Indiana Veterinary Medical Association em-

bracing the 11 regional groups in the state. This comprehensive table of organization, illustrating its component parts and suggestive function was concluded after careful study and discussion as an effort to strengthen institutional veterinary medicine in Indiana through its state officials and local associations. Evidence is apparent that objectives are being accomplished. Some precedence set might be of interest to other state groups.

Membership

Dr. Alvin C. Dufour, Elkhart, chairman of the Membership Committee advised that the cause of any non-membership in the state Association rested squarely with individual members. Misunderstanding by a few practitioners may result from personal contact, or its lack, by neighbors or the Association's representative. He referred to purposes of organization and the essential need for unified action.

Only by joint action will it be possible to effectively negate forces designed to minimize the service professional people are qualified to render.

He encouraged an attitude of all members toward newly graduated veterinarians. Recognition of these young men is important to progress and advancement of professional efforts within the state. This simply amounts to awareness of the principles of good intraprofessional relations — the starting place for developing favorable relations with other groups and the public.

Program

By design the program this year was exceptionally well illustrated. Out-of-state speakers for the Small Animal Section included Dr. Robert P. Knowles, Miami, Fla., and Dr. Ellis P. Leonard, Ithaca, N. Y. Both presented illustrated lectures. Doctor Knowles referred to a number of procedures and specially designed apparatus and methods developed in his practice. This included his recommendation for a cartilage bank, Stent suture technic, and procedure for wiring for reduction and fixation of mandibular fractures. The cartilage bank report appears elsewhere in this issue.

A formal presentation entitled Geriatrics by Doctor Knowles also appears on page 367 of this issue.

Officers elected at the Jan. 15-17, 1958 meeting of the Indiana Veterinary Medical Association are, left to right, Dr. R. F. Portman, Lafayette, president; Dr. L. A. Clark, Bedford, president-elect; Dr. Harry Magrane Jr., Mishawaka, vice president; Dr. L. M. Borst, Indianapolis, secretary-treasurer.

Doctor Leonard presented two well edited surgical films on which he gave running commentaries. Plans have been made to develop a discussion suitable for publication based on these topics. This discussion will appear in an early issue of VETERINARY MEDICINE.

Guest speakers presenting discussions at three sessions devoted to problems dealing with general practice problems also made free use of illustrated material primarily as kodachrome slides. Understandable difficulties preclude presenting much of this informative material on the printed page. Some Dairy Cattle Problems, presented by Dr. G. H. Conner, East Lansing, Michigan, appears on page 351 of this issue. Discussion of Dr. David O. Jones, Columbus, Ohio dealing with The Veterinary Practitions in Public Health appears on page 383. Dr. Howard W. Dunne, University Park, Pa. presented two illustrated talks, one dealing with experimental heavy metal intoxication in swine and another as a progress report on hog cholera research conducted at his station. Both were presented as lantern slide lectures.

Dr. R. K. Shideler, Danville, Ill., discussed some features of Beef Cattle Practice in his area, and Dr. R. L. Lundvall, Ames, Iowa, spoke of experiences at the Iowa State College Clinic with Shetland ponies. Both of these illustrated lectures were of most profit and pleasure for those fortunate enough to have been present.

Dr. Dyar C. Wood presented a formal discussion on Bovine Sterility. His untimely and sudden death prevented his examination of the transcript. Author approval was deemed advisable so that this discussion will not be published.

Indiana participants brought those present up to date on regulatory activities in the state and the work of various committees.

Army Veterinarians Confer

U. S. Army Photo

Lt. Col. L. C. Tekse, Third Army veterinarian, left, is shown here going over the agenda for the annual Third Army area Veterinary Conference with Brig. Gen. Elmer W. Young, chief of the Army's Veterinary Service.

Laboratory Refresher Training Courses

A schedule of laboratory refresher training courses for the period Sept. 15, 1958 through Apr. 10, 1959 has been prepared and enrollment opened. These courses scheduled during recent years at the Communicable Disease Center, Chamblee, Ga. and sponsored by the U. S. Public Health Service, have proved valuable to practitioners and technicians employed by veterinarians throughout the United States.

Information and application blanks may be obtained from the Laboratory Branch, Communicable Disease Center, U. S. Public Health Service, P. O. Box 185, Chamblee, Ga.

"Brucellosis and Heart Disease"

In a note under this title, Peery (*Jour. Am. Med. Assn.*, Mar. 8, 1958) suggests that calcific aortic stenosis is a sequel of brucellar endocarditis chiefly due to *Brucella abortus*. Calcific aortic stenosis is a disease most common in males corresponding in general to the sex incidence of brucellosis in man.

Animal Health

R. R. DYKSTRA, D.V.M.

Sex Control in Chicks

There is a claim that if fertile hen's eggs are wetted for a few seconds before incubation in a solution of male hormone or a female hormone, that the resulting hatch will be males or females respectively. (The process is patented).

In regard to the foregoing, an independent research worker reports as follows: (1) Dipping of eggs in androgen or estrogen solutions is an effective method of penetration of the shell so that "embryonic sex differentiation is modified." (2) However, the testes at six months of age are small and there is delayed spermatogenesis. In females from eggs that were hormone treated, one oviduct — the left is almost always the functioning one — was of insufficient size to receive the ovum, therefore, such females were frequently not normal layers.

Castration of Lambs

Since lamb castration and docking season is or soon will be in full swing, it is well to again emphasize that most practitioners condemn the use of the elastrator as being much more painful than the open method or the use of the Burdizzo forceps. Extensive inflammatory reactions above the site of application with prolonged pain following application of the elastrator frequently results in weight loss. When the elastrator is applied below the testicle, as sometimes happens when the operator lacks both skill and experience, as in the so-called "high flanker," animals retain masculine characteristics. Finally tetanus is a much more likely sequel following the use of the elastrator.

Heavy Metals Poisoning

Lewis and Meikle (*British Vet. Jour.*, 114:69 Feb. 1958) report on the Use of Calcium Disodium Versenate in Heavy Metal Poisoning in Livestock. This report deals mostly with the handling of lead poisoning in ruminants, though the agent, calcium disodium ethylene diamine tetra acetic acid (Ca-EDTA), is apparently equally effective in the handling of mercury, copper and other heavy metal intoxications. The remedy does not materially displace calcium and therefore, its use does not result in anemia or derangement of vitamin B metabolism. Calcium disodium versentate (Ca-EDTA) is available for animal poisonings in solutions of 25 gm. in 100 ml. of water. This in turn is diluted by the veterinarian with sterile normal saline or glucosaline so as to give a final 5% product for intravenous administration. In order to combine with a lethal dose of lead 1 gm. Ca-EDTA for every 30 lb. of body weight is indicated. Safety margin is wide as 3 gm. have experimentally been given per kilo without fatality. The recommended dose may be repeated, in fact this is advised, so as to result in complete chelation. Also, there is value in oral administration, of sulphates to precipitate unabsorbed metal in the digestive tract.

Malathion — Organic Phosphate Insecticide

It is informative to learn that the Federal Food and Drug Administration has cleared the residual chemical malathion as either a spray or for direct dusting on beef cattle, swine, or poultry to kill horn flies, ticks and lice, or in fact almost any kind of poultry pest, but it may not be used in any form on dairy animals. It may also be used as a building application provided precautions are taken to keep it out of milk and drinking water. By the addition to it of sugar its residual life is lengthened to approximately 14 days.

At about the same time federal agencies no longer recommend the use of methoxychlor directly on dairy animals.

Poultry Practice

W. R. HINSHAW, D.V.M., Ph.D.

Fly Control

The USDA in a recent press release (*The Poultryman*, April 18, 1958) advises the use of poison baits as an aid to sanitation in combating flies on a poultry farm. A special bait formulation that is giving good results is as follows:

Granulated sugar	5 lb.
Dry, clean sand	5 lb.
25% wettable powder malathion	¾ lb.
Household gelatin	6 oz.
Water	2 to 2½ cups

These ingredients should be mixed to a consistency of a thick paste. Diazinon may be substituted for the malathion. This mixture is used by smearing sections of plastic impregnated screens that are in common use on poultry farms. The treated sections should be placed where they will attract the most flies — on floors of houses, on window sills, in feed rooms, or other places where flies rest or search for food.

Dry baits available commercially, using malathion, or similar poisons, are also effective. Poison baits are, however, only adjuncts to good management practices, which should include removal of manure at least twice a week.

Poultry Inspection

Poultry Grading and Inspection, USDA, Information Bulletin, published recently by the Agricultural Marketing Service, summarizes the regulations for inspection, and the standards for determination of poultry quality. These regulations and standards are those which will govern the voluntary interstate inspection service program authorized by Congress on August 28, 1957. This legislation requires that by January 1, 1959, all poultry and poultry products moving in interstate or foreign commerce will be inspected for wholesomeness. In addition to giving the USDA policy in developing regulations for poultry; the basic requirements of inspection; definitions; and federal and federal-state programs for grading and inspection; the bulletin contains information on the importance of the industry, a list of USDA, AMS area offices and statistics on poultry inspected. The bulletin is available from Superintendent of Documents, Washington 25, D. C. (Price 15 cents).

Pink Discoloration in Eggs

Pink discoloration in eggs during cold storage is associated with the feeding of cotton seed oil or cottonseed. Several uncommon oils, including those from Kapok seed and the Indian tree *Sterculia foetida*, also cause the pink discoloration. Since sterculic acid is the major constituent fatty acid of *S. foetida* oil, Masson, Vavich, Heywang and Kremmerer (*Science*, 126:751, 1957) conducted a series of experiments to determine its role as the causative substance. This they were able to do by feeding tests, first with *S. foetida* oil and its components in an elimination process, and then by feeding pure sterculic acid to White Leghorn laying hens.

It was shown by Schiable *et al.* (*Poultry Science*, 25:440, 1946) that the pink discoloration is a result of a combination of the white with ferrous ion of the yolk. Increased permeability of the vitellin membrane allows diffusion of proteins and water into the yolk. Reverse diffusion of the complex into the white accounts for the pink color of the white. The yolk enlarges and becomes apricot colored as a result of the blending of the pink color with the natural yellow of the yolk. According to Masson *et al.* sterculic acid apparently causes an increase in permeability of the vitellin membrane which leads to the pink discoloration.

Other references to research on pink discoloration in stored eggs will be found in *Vet. Med.*, 47:433, 1952 and 50:196, 1955.

Public Health

JAMES H. STEELE, D.V.M., M.P.H.

Public Health Research Expanded in Czechoslovakia

The Czechoslovakian government has expanded the national public health research program. Medical research including that related to public health and veterinary medicine are conducted in various ministries and agencies. These include the (1) Ministry of Health (2) Ministry of Agriculture (3) Ministry of Education and the (4) Academy of Science.

The Ministry of Health has both central and district public health laboratories for routine services. In addition, there is a system of epidemiology laboratories to support investigations of disease outbreaks. Epidemiology services are under the direction of Dr. Karel Raska. This service has been active in the recent Asian influenza epidemic. In Czechoslovakia, more than 1,000,000 persons of a total population of 14,000,000 were stricken with flu in September and October 1957. Between 300 and 400 deaths resulted directly from this virus disease. In 1956, an equine influenza epizootic spread through central Europe following its appearance at the Dresden (East Germany horse show. It is estimated that thousands of horses were afflicted in Germany, Czechoslovakia, Austria, Hungary and Yugoslovakia. Investigators working with the virus described it as a type A influenza virus. The agent causes a mild respiratory disease characterized by sudden rise in temperature, depression, loss of appetite, and weakness. Conjunctivitis and lacrimation are also noted. Sometimes there is a nasal discharge and labored breathing. The infection is similar to that described as equine influenza by early veterinary clinicians in Europe and America, although in the latter instant the etiological agent was not related to the classical influenza family types. The disease is not thought to be naturally communicable to man or any other host.

Possible Animal Reservoirs

Since identification of this type A influenza virus, two related viruses have been isolated from ducks in Europe. These isolations lend further support to the hypothesis that there may be reservoirs of influenza in nature where the organism gradually develops until it has the ability to attack other hosts including man. It is not known if the newest duck influenza virus affects man.

Other diseases under study in the epidemiology institute include ornithosis, Q fever, leptospirosis, streptococcal infections and various childhood diseases, excluding poliomyelitis which is in another institute of the health service.

The Ministry of Agriculture has a series of veterinary diagnostic laboratories through out the country which serve as reference centers for state veterinarians. There are no private practitioners in the country. A new research center is being built at Brno, where the national veterinary school is located.

The Ministry of Education supports many medical research programs including those both in medical and veterinary faculties. One of the most interesting studies is that of Teschen disease, a poliomyelitis-like syndrome in swine. This infection is a serious problem throughout Czechoslovakia and neighboring countries. A killed vaccine is used for prevention, but protection induced is variable. Professor F. Patocka of the Charles University Medical Faculty is a leading authority on this disease and has published extensively during the past 20 years.

The Czechoslovakian Academy of Science also underwrites research including medical,

Continued on page 397

Practitioner's Laboratory

W. L. SIPPEL, V.M.D., Ph.D.

Florida Livestock Board
Kissimmee, Florida

Icterus Index--Buffy Coat

Readers are referred to earlier issues of this journal for information on the hematocrit or packed red cell volume test and the sedimentation rate (see VETERINARY MEDICINE, 53:278 [Mar.] and 53:339 [June], 1958). Two additional tests that can be run concurrently are the icterus index and observations on the buffy coat.

Icterus Index

The color of the column of plasma lying at the top of the tube following centrifugation can be used to estimate the icterus index or amount of bilirubin in the plasma. Icterus will become apparent by use of this test prior to becoming detectable in the mucus membranes. The intensity of the color is measured by comparing with a set of standards containing 1, 2, 5, 7.5, 10, 15, 25, 50, and 100 parts of potassium dichromate in 10,000 parts of water. Standards and a comparator block can be purchased from laboratory supply houses. The reading is given as the number on the tube most nearly matching the color of the plasma.

The normal icterus index varies between species and is influenced by the amount of chlorophyl, carotin, lutein, and other lipochromes in the diet. Flotmersh[11] has described a technic to remove these pigments. Hemolysis of the blood will also interfere with the test.

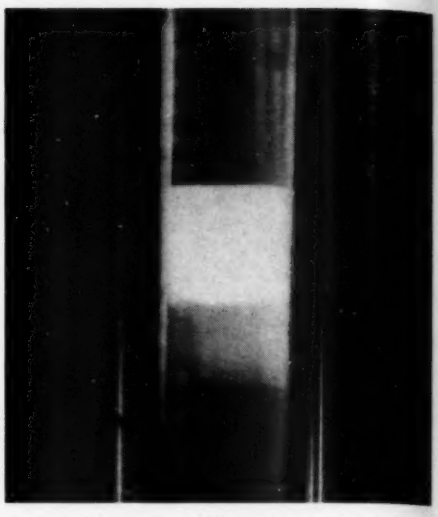


Fig. 1. Close up view of Wintrobe tube. Starting at the bottom the successive layers are the erythmocytes, reddish leucocyte layer, gray platelet layer, and the plasma. The leucocytes and platelets are increased above normal.

Coffin[8] lists the following values as the normal ranges of icterus index:

Dog	2- 6
Cow	6-15
Horse	10-25
Sheep	2- 6
Swine	2-10

Readings up to 10 give only a slight yellow color to the plasma, thus any distinctly yellow color indicates a hyperbilirubinemia.

Any condition resulting in excess erythrocyte destruction, damage to hepatic cells (hepatitis) leading to interference with bilirubin metabolism or interference with bile flow, will produce a high icterus index. Such conditions are leptospirosis, babesiasis, infectious canine hepatitis, phosphorus poisoning, crotalaria and other plant poisonings, *Clostridum hemolyticum* or *C. perfringens* (some cases), tumors or parasites interfering with the flow of bile, and other conditions.

The degree of dehydration of an animal is additional information that can be gained from the height of the plasma column. If the column of erythrocytes is high and the leukocytes normal, the plasma column will

be shorter than normal, indicating a polycythemia or dehydration. If dehydration is involved it should be evident clinically. In cases of dehydration, the efforts of the clinician to correct the condition can be accurately evaluated by the height of the plasma column.

Buffy Coat Layer

Following centrifugation of the Wintrobe or capillary tubes, a reddish gray and a gray layer will be observed on top of the packed erythrocytes (fig. 1). The former consists of a mixture of leukocytes and platelets. The gray layer is made up primarily of platelets. A microscope ocular held close to the tube and looked through in the reverse of the usual direction will be helpful in visualizing these layers.

The buffy coat layer usually amounts to 1% of the total height of the column. Marked alterations in the thickness of this layer indicate, in a general way, corresponding changes in the total white blood cell count. This observation is no substitute for the total leukocyte count, but may indicate when that technic is desirable. Cooper[12] has indicated that the thickness of this layer in swine blood can be used as an indicator of the leucopenia accompanying hog cholera.

The absence of platelets in certain poorly understood blood diseases of dogs and men, and in bracken fern poisoning of cattle, has been noted. The platelet count is increased following trauma, surgery, bone fractures and splenectomy.

REFERENCES

11. Flotmersh, H. J., A New Method for the Clinical Use of the Icterus Index. *N. Am. Vet.*, 36:551, 1955.
12. Cooper, C. M., Macroscopic Examination of Blood of Small Animals. *Jen-Sal Jour.*, Dec. 1954.

Agriculture Big Business

"Agriculture is a great stimulus to other industries. It brings you up short to realize that 18,000,000 full-time jobs are provided just in the marketing phases of agricultural products. Another 6,000,000 persons are employed in plants which make materials and supplies for farmers' use.

"In terms of dollars, agricultural producers spend $12,000,000,000. to $13,000,000,000. each year for production goods and services, and that does not count consumer items.

"These facts make the point that agriculture, in its broadest sense, is big business. It is larger by far than any other comparable industry. As of last Jan. 1, farm assets alone were at an all-time high of $188,000,000,000.

"With America's traditional respect for bigness *per se*, it is unthinkable that we can any longer deny an industry of this size the recognition it deserves. Agriculture must, and will, attain co-equal status in our economic structure. Industries associated with the agricultural complex must assume a full measure of responsibility in bringing this about."

These statements, from an address to a group of research men in the Midwest by Senator Knowland of California, point up the fact that farming, not unlike mining or manufacturing, is not a "lone wolf" enterprise grinding out an existence from the soil. It is rather a collection of individual enterprises which add up to a team second to none in scope and importance.

Public Health Research

Continued from page 395

veterinary and public health. The Central Virus Institute in Bratislava is a part of the Academy of Science.

At this center, animal and plant diseases are studied as well as those that affect man. Among diseases under study were influenza, poliomyelitis, tick-borne and western equine encephalitis and Q fever. The plant disease under investigation is yellow aster virus disease, which attacks many different types of plants in southeastern Europe. This Academy is certainly one of the most interesting centers in central Europe.

Distaff

MRS. E. F. (HAZEL) EBERT

Wives of Young Graduates

I have often wondered who is the most pedantic in facing new veterinarians and their wives. Many of us like to think of familiar stereotypes — absent-minded professors, esoteric scholars, quaint scientists— as those who deliver withering blows to the uninitiated. Few of us realize that we, the average wives of practitioners, Anytown, U.S.A., have stellar roles in the drama of dealing with wives of recent graduates.

The wives of young graduates entering the field of veterinary medicine have spent time and thought in trying to prepare themselves for their new regime in life. They are alert and dedicated young ladies, and are anxious to take their place beside their husbands in a veterinary calling. These girls are willing to work, to receive advice, and will appreciate any help wives of earlier graduates will give.

Wives of established veterinarians can recall how many problems came up when they were first married. They can remember the strangeness of service with their husbands in the army, research, commercial work, education, or practice. Any conversation that deals with yesteryears usually points with interest to adjustments that once had to be made.

Those of us who have made the adjustments can now help the newcomers with friendliness, patience and interest, or we can vaporlock ourselves in an elusive tower of pedantries. Neither attitude will change the end results very much. With the passage of years younger veterinarians and their wives will assume command. We have only to help or hinder before we abdicate. The friendly, patient, interested attitude is best because it makes the process of life a wonderful experience for all concerned.

When the recent graduate moves into your community either to compete or work with your husband, a heaven-sent opportunity to welcome the young graduate's wife presents itself. If she is shy or reticent, it is not that she is trying to be aloof or unfriendly. She is merely waiting for you to tell her you are glad she is there. If she seems more than anxious to get established, it is not because she is presumptious or haughty, but because she is trying to please.

I know these girls make mistakes, but these are of the head, not the heart.

"Much to Learn"

For some of us time moves cautiously and deliberately, for others it breaks through like a pent-up flood. Young wives are sometimes consumed with apathy as the hours drag by in little packages of 24. I remember attending a dinner in Washington, D.C. in the early 30's. I was sitting near a veterinarian who had graduated ten years before from Colorado. I thought I saw eternity etched in his eyes and woven into the folds of wrinkles on his face, and I could hardly feature my husband and myself ten years later. I was a young veterinarian's wife then —and I had much to learn.

Young wives today too have much to learn. What more enjoyable experience can one get out of living than that of realizing one has helped another less experienced over some rough spot on a strange road?

Personal Appearance

Personal appearance is an important factor in the success or failure of the wife who spends time in her husband's office. Some wives prefer to wear white uniforms. Other, like myself, wear either white or simple washable dresses. The office is not a setting for a style show, but it nevertheless demands a certain dignity and bearing. Cleanliness in personal appearance does not apply to clothes alone. It is important that the wife be well groomed.

Books reviewed in this department and any other books, if available, may be obtained by remitting published price to the Book Department, VETERINARY MEDICINE, Suite 803 Livestock Exchange Building, Kansas City 2, Missouri.

Practitioner's Bookshelf

VETERINARY PHARMACOLOGY AND THERAPEUTICS, by *Dr. L. Meyer Jones,* Professor of Veterinary Pharmacology, Iowa State College, 2nd edition, 944 pages, The Iowa State College Press, Ames, Ia., 1957. Price—$11.50

Since the first edition of this useful text appeared in 1954, two reprintings were sold out, attesting the popularity of what the author modestly refers to as "An experimental effort in summarizing and correlating available knowledge in veterinary pharmacology and therapeutics."

Though the first edition was considered an up-to-date text and reference, so rapid are changes and revisions in the field, as well as additions to the list of therapeutic items, that revision and reorganization was deemed necessary. This has been accomplished thoroughly — no portion of this book has escaped some revision, and major changes have been made in a considerable portion of it.

Text material is presented in 11 parts and 58 chapters. The newly created Part VIII entitled Chemotherapy represents the major change from the previous edition. It (Part VIII) contains five chapters and over 300 pages. Included are chapters on Local Anti-infective Drugs (Antiseptics and Disinfectants), Systemic Anti-infective Drugs (Sulfonamides and Antibiotics), Internal Antiparasitic Drugs, and External Antiparasitic Drugs.

Pharmacology of the Rumen designates a new chapter under Part III, Drugs Acting on the Digestive Tract. The basic concepts contained resulted from studies and interviews with veterinarians and other workers in the field in Europe during the author's recent tour as a Fullbright teacher in veterinary pharmacology to the Tierarzthche Hochschule, Vienna, Austria. Two appendixes — one devoted to the tabulation of use and dosage of selected drugs, the second to those practically obsolete are included. Finally a complete index makes possible rapid reference to specific discussions, adding to the book's usefulness as a reference volume.

Veterinary Pharmacology and Therapeutics ought to be read by every practitioner and then kept handy for reference. No other text in the field is available that approaches its completeness and comprehensiveness.

NEW AND NONOFFICIAL DRUGS— 1958, Annual Publication of the Council for Drugs of the American Medical Association. J. B. Lippencott Company, Philadelphia, Pa., Publishers, 1958. Price—$3.35

New and Nonofficial Drugs, formerly New and Nonofficial Remedies, contains descriptions of drugs evaluated on the basis of available scientific data and reports of investigations. It deals with agents proposed for use in or on the human body, for diagnosis, prevention or treatment of disease. Many of these have applicable value in veterinary medicine.

Descriptions (monographs) are limited to individual drugs generally available that

have not been included in the Pharmacopeia, National Formulary or N.N.D. for prior cumulative period of 20 years. Information is included on chemical or biologic identity, including pertinent properties, action and uses, including associated side effects, toxicity and precautions, and dosage, including route of administration.

ANIMALS IN MOTION, by *Eadweard Muybridge*, 74 pages text, 183 full page plates, (edited by *Lewis S. Brown*), Dover Publications, Inc., New York, N. Y., publishers, 1957. Price—$10.

In 1872, San Francisco was the scene of a controversy concerning the possibility of a horse, "while trotting—even at the height of his speed—having all four of his feet, at any portion of his stride simultaneously free from contact with the ground." Eadweard Muybridge proved that a horse can have all four feet off the ground at the same time, and in so doing launched his career as a student of animal motion.

Despite modern equipment, little has since been learned that Muybridge did not know. Accordingly, all students of animal motion find their way back to this monumental work.

Plates are for the most part excellent, considering that the editors were faced with technical difficulties in reproducing faded photographs. None have been retouched, and all still tell the story as well today as when first developed.

FARM TROUBLE, by Lauren Soth, 221 pages, Princeton University Press, Princeton, N. J., publishers, 1957. Price —$3.75.

During the past several months, readers of VETERINARY MEDICINE have been introduced to certain aspects of agricultural economics. (See *Vet. Med.*, 53:173 [Apr.] and 53:283 [May], 1958.) *Farm Trouble* takes many of the same premises and draws what the author believes to be appropriate conclusions. The book itself is clear, competent and honest. It is also controversial. Veterinarians who wish to understand American farm trouble (in reality a number of troubles) will want to read and reread this book.

In an excellent statement of the situation, the author not only sets out the problem, but at the same time disposes of many farm shibboleths as well. Lauren Soth examines the catechism of farm politics (thou shalt invariably promote the family farm; thou shalt elevate the rural life above urban life; thou shalt steadfastly uphold parity for the farmer; thou shalt blame the middleman for economic difficulties) and explodes the folklore (keep agriculture out of politics; natural foods are better than synthetic proteins and fats; agriculture is our most fundamental industry) in a refreshing style that reads like epic poetry.

The author explains why policies pursued through several administrations have failed to solve farm trouble — namely decreasing returns for ever increasing supplies of farm products.

Farmers are in a dilemma, according to the author. As individuals they control only one variable — production. Every individual farmer automatically produces as much as possible. In the aggregate, agriculture has continued to advance its productivity as a result of scientific advancements, and veterinary medicine has contributed heavily in this direction. Ironically, increased total output reduces farm income per person because farm products are generally subject to inelastic demand. There is no One World as far as food consumption is concerned because of political barriers. Changes will continue to be evolutionary in agriculture, and the existing farm trouble will continue in the foreseeable future.

Veterinarians will not likely find in these pages a direct answer to what will be their status in the changing agricultural scene. But leaders interested in charting the course of the profession, or individuals interested in detecting trends, can use this as a springboard for action, either at the institutional or the individual level.

IN PASSING . . .

When The Crow Rode The Elk

J. R. Thompson, a prominent Montana cattleman, was holding forth in the Brown Palace in Denver on August 13, 1902. He gave out with some rare accounts of exploits performed by a Crow Indian named, oddly, Jim Crow.

Jim Crow worked for John Springer's Continental Horse Company in Southern Montana and was renowned for breaking horses without saddles. One night Lefors, one of the management's chief lieutenants, and some of the boys got to discussing the exploits of Jim Crow. A cowpoke flipped the ashes from his cigarette and said he reckoned Jim Crow could ride just about anything on four legs.

Lefors pondered this for a moment. "I wonder if he could ride an elk?" he said at length. And after a moment, when the beauty of the idea had reached its proper appreciation, he added: "I'd like to make a bet he can't."

"Well, you get the elk and I'll bet he can ride it," retorted one of the cowboys.

The particulars of the bet were duly settled. A new pair of blankets to be paid for by the loser and to become Crow's property if he rode the elk was the wager.

Rodeo Aboard an Elk

The contest came off about a month later. The boys had experienced some difficulty in catching an elk, but they finally trapped a big buck near Belle Fourche, where the field corral was located. Jim Crow bounded into the corral and the fight was on.

The elk acted surly from the start. It charged at the Crow Indian, who dodged behind the snubbing post. It ran around the corral as if to inspect the fence for defects. In the meantime Jim mounted the snubbing post, and prepared to throw his loop. The animal bounded around the arena and came into range. The Crow Indian cast his loop—and missed!

As Jim gathered in the rope for another try the elk lunged for the snubbing post, and Jim made his move. Without hesitation or ceremony he jumped to the elk's shoulders, sank his spurs, and settled himself for the struggle.

In the arena the ride was brief, consisting of a few turns and jumps. But along one wall of the corral the top rail of the eight foot fence was missing. The elk ran pell-mell across the enclosure and jumped over the lowest part of the fence—some six feet high—and with the rider still on its shoulders headed for the tall timbers. The boys on the fence were no longer amused at the daring of the Indian cowboy — in fact they sensed something more than genuine danger. In a moment they were mounted and trailing the elk-riding cowboy toward the woods.

The elk, with the Crow Indian still on its back, plunged into the heaviest timber in the area, hoping to brush the daredevil rider from its back. The immovable timber and the irresistable elk contacted with a sickening crash. The elk lost one prong of its antlers, but not the unwelcome rider. Into another clump plunged the panic-stricken buck elk, and then another, but the Indian stayed on its back, as though grown there like the camel's hump.

It was over a mile from the corral that the Springer Ranch cowboys caught up with the elk riding Indian. He was standing near the exhausted animal, grinning foolishly. In broken English he explained that the elk had just quit running.

A Qualifying Ride

There was no question about this being a qualifying ride. The bet was settled and the Crow Indian returned to the bunkhouse, a happy and satisfied owner of two new blankets.

The elk had broken a foreleg somewhere during the ride and had to be destroyed. The antlers were taken by Lefors and mounted on a wall at the Springer ranch, and for years the broken-prong stickers inspired the telling and retelling of what was perhaps the most fabulous bareback ride of the century.—*Charles Walters Jr.*

Classified Advertisements

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Doctor Craige Succumbs to Illness

Dr. A. Henry Craige, Jr., chief veterinarian for Pitman-Moore Company died Friday, April 11, after an illness of several months. He was 48.

Dr. A. Henry Craige, Jr.

A native of Philadelphia, Doctor Craige was a graduate of the University of Pennsylvania. Following graduation in 1932, he became a member of the University's teaching and scientific staff until 1941 when he joined Pitman-Moore Company as a veterinary pharmacologist, working in research and sales promotion.

In 1945, he left the Indianapolis firm to enter private practice in Pennsylvania and two years later became professor of veterinary physiology at the University of Maryland.

In 1951, Doctor Craige returned to Pitman-Moore Company as chief veterinarian. During his career, he played major roles in the development of a number of products which have added valuable therapeutic items to the practitioner's pharmacy.

Doctor Craige served as a consultant with the U. S. Treasury Department, Bureau of Narcotics, in the development of a method of testing race horses for "doping", now generally used throughout the country.

For several years, he was a lay leader in the Episcopal Church both on parish and diocesan level, and had been preparing to become a deacon. Had it not been for his illness, he would have been examined for the ministry in February.

Doctor Munce Victim of Heart Attack

Dr. Thomas W. Munce

Dr. Thomas W. Munce, former director of Pitman-Moore Company's biological laboratories, and retired official of the pharmaceutical firm's parent company, Allied Laboratories, Inc., died Monday, April 21, in a Sioux City, Iowa, hospital following a heart attack on Sunday. He was 66.

Doctor Munce joined Pitman-Moore Company in February, 1919, engaging in production and research at the Zionsville, Indiana, laboratories. He rose to the position of president of the Sioux City Division, vice president of Allied Laboratories, Inc., and a member of its Board of Directors. He retired in March, 1957.

A native of Washington, Pa., he was considered an outstanding authority on the subject of swine diseases and their control. He had many scientific papers published on the subject.

·VM·

Following rigid investigation by New York State, and after competitive bidding, the Syrall Manufacturing Company of Syracuse, N. Y. was awarded exclusive contracts to install its gas fired crematory destructors in all the restaurants along the New York State Thruway. It was calculated by the department of engineers to be the equipment most satisfactory for the job of waste disposal (wet and dry garbage or other combustibles). Samco destructors are available to the veterinary profession for use as crematories or destructors.

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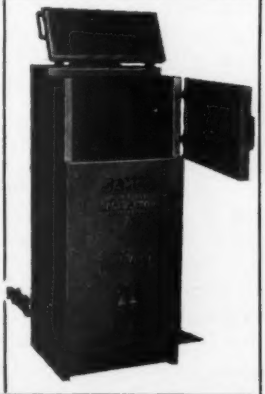

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This department will announce each issue new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted.

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Germa-Medica, a medicated liquid soap, has been used successfully in combating infections that break out on hands of chicken pinners in poultry plants. For more information, write Huntington Laboratories, Inc., Huntington, Ind.

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Use of Anticoagulants in Rodent Control F-298 is a 35 mm. color, sound film 9½ minutes long, cleared for TV, that provides a comprehensive description of how anticoagulants are employed to kill rodents. The film is available for short-term loans from Communicable Disease Center, P. O. Box 185, Chamblee, Ga. to interested groups in the United States; it may be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

Musculoskeletal Disorders in both large and small animals can be treated with phenylbutazone (Butazolidin — Jensen-Salsbery) which acts directly on tissues, rather than through the endocrine system. The drug is anti-inflammatory, analgesic and antipyretic. Manufacturer claims that it can be used without danger of metabolic upset or glandular atrophy. For additional information, ask Jensen-Salsbery Laboratories, 21st & Penn, Kansas City 41, Mo.

An automatic **Bulk Auger Feeder** that can feed from 100 to 6,000 hogs from one bulk storage bin is recommended for clients of

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veterinarians specializing in swine practice. The unit provides a continuous supply of fresh feed and prevents outside contamination. For more information write Ranger Research, Delphi, Ind.

Horses and Cattle can now be covered by life insurance. For limitations, terms of insurance, and eligibility, check with Animal Insurance Company of America, 92 Liberty St., New York 6, N. Y.

Doctor William S. Gochenour Retires

Dr. Wm. S. Gochenour, for 45 years one of the country's leading veterinarians, and associated with Pitman-Moore Company, Division of Allied Laboratories, Inc., for more than 20 years, has retired.

Dr. William S. Gochenour

Dr. Gochenour became director of the Indianapolis firm's biological laboratories near Zionsville, Indiana, in 1937, and was made vice president in charge of veterinary relations in 1952.

A native of York, Pennsylvania, he received his V. M. D. degree from the University of Pennsylvania School of Veterinary Medicine in 1913. He engaged in private practice shortly after graduation until 1915 when he entered the service of the Bureau of Animal Industry, USDA. He was assigned to the Field Inspection Division in the campaign for the eradication of Foot-and-Mouth Disease.

Among other items of his work in the division were studies resulting in the isolation of the buffalo strain of Pasteurella, an organism involved in the causes of shipping fever. His work, during the isolation was so exacting that even today, though more than 30 years later, the buffalo strain is the one by which all other Pasteurella strains are standardized.

Doctor Gochenour has many scientific discoveries to his credit. During World War II he was an active member of the Allied Joint Research work on bacteriologi-

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A neutral detergent containing Hexachlorophene and Lanolin Esters.

TROPICAL TICK AND FLEA SPRAY
A safer, more effective non-staining residual spray for home and kennel.

TROPICAL KENNEL DUST
Kills Fleas and Ticks on lawns and in kennels.

TROPICAL TICK SALVE
Kills Ticks and Mites in ears and between toes.

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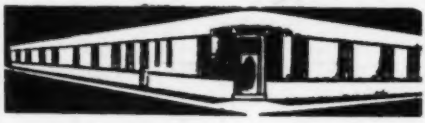
Division of Pet Chemicals, Inc.
1038 N. W. 21st Terrace, Miami, Florida

Milo in Poultry Feeds

Since milo is a relatively high energy grain, it can be used in high energy broiler feeds. Because of its lack of carotenoids, it usually does not replace all the corn in such feeds. Practical feedmen will frequently use half and half milo as the grain contribution of such broiler feeds. The formula must then provide an additional amount of vitamin A to insure adequate levels. Where pigmentation is a factor, other means will have to be used to get pigmenting factors. This may be in the form of alfalfa meal or even commercial zanthophyll products.

For the Veterinarian



DETROIT VETERINARY SUPPLY CO.

DETROIT 32, MICHIGAN

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Continues from page XXXV

cal warfare and biological production, and in this capacity was instrumental in assisting the Allied Armies to keep disease to an absolute minimum.

In addition to the American Veterinary Medical Association, he is a member of the U. S. Livestock Sanitary Association, the Indiana Veterinary Medical Association and the American Society of Bacteriologists.

tested medicinals direct by mail

10cc Procaine Penicillin — Aqueous Suspension 300,000 Units per cc	10 Vials	$ 3.10
	100 Vials	28.95
	1000 Vials	279.00
10cc Procaine Penicillin — 400,000 Units with ½ gm. Dihydrostreptomycin in each 2 cc Aqueous Suspension	10 Vials	6.35
	100 Vials	58.00
	1000 Vials	560.00
1 Vial — Penicillin G Powder — 500,000 Units each	10 Vials	1.60
	100 Vials	15.00
	1000 Vials	140.00
10cc Dihydrostreptomycin Solution — ½ gm. per cc	10 Vials	6.25
	100 Vials	57.00
	1000 Vials	550.00
5gm. Dihydrostreptomycin Powder	10 Vials	6.25
	100 Vials	57.00
	1000 Vials	550.00
Tetracycline Capsules 250mg	100	22.49
	5x100	110.00
Penicillin Tablets — Soluble — 100,000 Units	100	1.45
	1000	12.00
	5000	53.00
Penicillin Tablets — Soluble — 200,000 Units	100	2.50
	1000	22.00
	5000	104.00
Penicillin with Triple Sulfas — 300,000 Units	100	4.95
	1000	47.50
Achromycin V Capsules 250mg — Lederle	100	27.50
5cc Acth-Gel — 40 units per cc Standard Brands	1 Vial	2.65
	10 Vials	24.50
	100 Vials	235.00
5cc Acth-Gel — 80 units per cc Standard Brands	1 Vial	4.95
	10 Vials	46.00
	100 Vials	440.00
Prednisone or Prednisolone — 5mg — Specify	100	6.50
	1000	62.00
	5000	285.00
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	10 Vials	24.00
	100 Vials	230.00
	1000 Vials	2200.00

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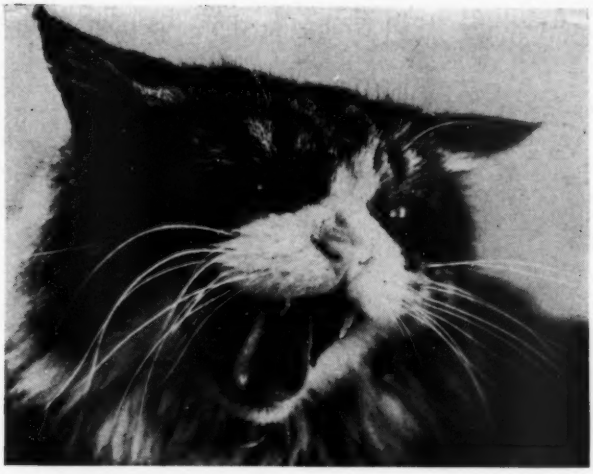
nationally known antibiotics, therapeutics, hormones, biologicals, vitamins and pharmaceuticals for all animals



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HYDROCHLORIDE

Promazine Hydrochloride, Wyeth

CALMS—*safely, effectively*

SPARINE *effectively* controls nervousness, excitability, unruliness in all animals without stupefaction. It leaves the animal relaxed and manageable.

Repeated periodic administrations of SPARINE to dogs and rats for one year at the Wyeth Institute for Medical Research revealed no instances of anemia or other blood dyscrasias, jaundice, agranulocytosis, hematuria, urticaria, photophobia, or allergic dermatitis.

SPARINE simplifies diagnosis and treatment, especially in x-ray and otoscopic procedures, surgery, dentistry, and handling. It reduces struggle and the risk of injury to *both* animal and veterinarian.

AVAILABLE:

TABLETS: 10 mg., vials of 50. 25, 50, 100 and 200 mg., vials of 50 and bottles of 500.
INJECTION: 50 mg. per cc., vials of 2, 10 and 30 cc.
SYRUP: 10 mg. per 5 cc., bottles of 4 fl. oz.

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Professional literature supplied on request

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New! BACTERICIDAL-FUNGICIDAL TRIOCIL SPRAY!

CLINICAL USE SHOWS RAPID HEALING OF:

- dermatoses
  ringworm, fungus infections,
  eczema, hot spots,
  acute erythematous
  and moist dermatitis
- otitis externa
- minor cuts and wounds
- paronychia
- pyogenic infections

No resistant organisms have been reported.

USE TRIOCIL SPRAY TWO WAYS! FOR DROPS . . . FOR SPRAY!

Turn outlet down to dispense drops.

Hold bottle upright and squeeze to spray.

Now your Triocil treatment for dogs, cats and large animals can be faster and easier than ever! Triocil Spray is now available . . . with a penetrating alcohol-acetone base . . . conveniently packaged in a 50 ml. squeeze bottle. Also in ointment and solution (shampoo-like detergent base).

Triocil Spray is effective against practically all organisms that cause or complicate skin infections. And you will find Triocil Spray invaluable for pre-surgical preparation. Because Triocil has high tissue affinity, it resists licking and rubbing off—leaves a faint, identifying pink color on the skin. Pleasantly scented!

Triocil® Spray

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Sold only through veterinary distributors

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When metabolic imbalance complicates dermatologic problems . . . use Anabolin as adjunctive therapy.

Dvorkovitz to Jen-Sal Helm

Dr. Vladimir Dvorkovitz

Dr. Vladimir Dvorkovitz has been named president and general manager of Jensen-Salsbery Laboratories, Inc., of Kansas City effective June 9, 1958. Dr. Dvorkovitz succeeds Charles M. McCallister who will become president and general manager of the National Drug Company of Philadelphia.

Laboratory Service for Veterinarians

VETERINARY DIAGNOSTIC LABORATORIES

These laboratories have been established to aid veterinarians in the diagnosis of obscure as well as common ailments in large and small animals. The chief aim of our staff is to give quick and accurate diagnosis at all times.

Our service includes fecal examinations, anti-biotic sensitivity tests, urinalyses, blood counts, tissue sections, bacteriological cultures, cultures for ringworm and blood chemistry. It is designed to assist owners and breeders of stock of all kinds including dogs, cats, horses, cattle, poultry, hogs and sheep.

Sample containers and price list on request.

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—SHOR-LINE— Hydraulic Lift Operating Table

Available as follows:

With white porcelain enameled base and white porcelain enameled top.

With white porcelain enameled base and stainless steel top.

With pastel green porcelain enameled base and stainless steel top.

Top drawn from one piece with round corners; no welding or seams, no sharp edges exposed. Size 22 x 60 inches.

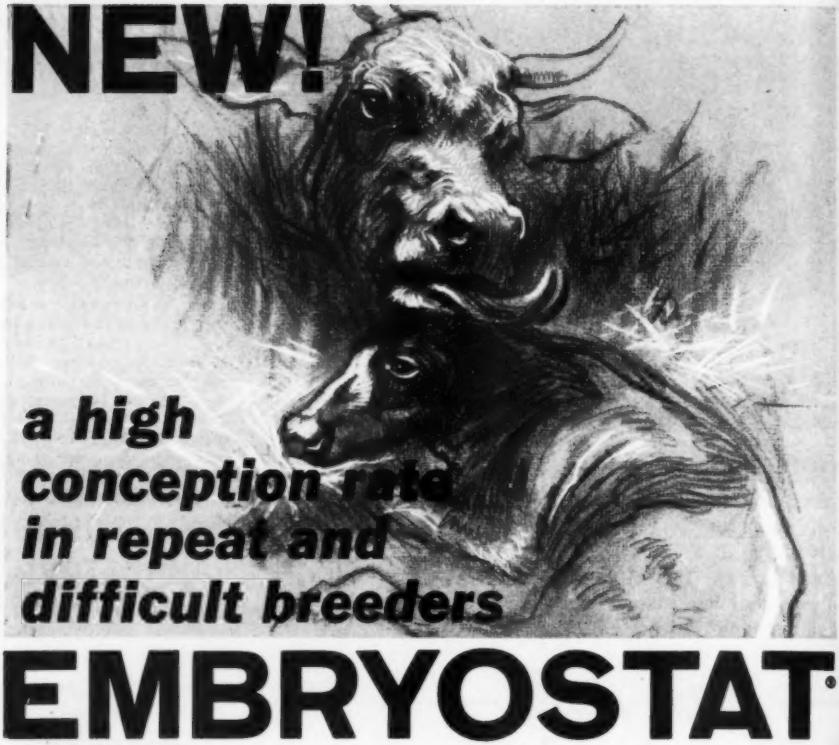
All trim parts are chrome plated

Height of top can be adjusted from a low of 29½ inches to a high of 39½ inches.

From leading Veterinary Distributors

SCHROER MANUFACTURING CO., 2221 Campbell, Kansas City 8, Mo.

Manufacturers of complete line of veterinary tables—Animal cages—instruments and equipment



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®BRAND OF OXYTETRACYCLINE

EMBRYOSTAT may be used in the uterus or the vagina as follows:

- *In utero* during breeding rest
- Intravaginally at the time of artificial insemination or natural service
- *In utero* two hours before or 2 to 72 hours after artificial insemination or natural service

EMBRYOSTAT is administered simply by attaching a syringe containing the infusion to an insemination pipette. Available in 20 cc. vials.

EMBRYOSTAT's effectiveness in combatting low-grade infection and its noninterference with the fertilizing ability of the semen help produce the results seen in this clinical summary.*

No. of Trials	*No. of Cows*	*No. of Services before Embryostat*	*% Conception with Embryostat*
1	19	3.44	80
1	16	2.25	88
1	24	3.21	80
1	124	2.00	80
4	183	2.7	82%

Sold only to veterinarians
Department of Veterinary Medicine
PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N. Y.

*Clinical trials reported to Chas. Pfizer & Co., Inc., Terre Haute, Indiana

"The Many Faces of Pharmacy"

In his address before the Missouri Pharmaceutical Association, John A. MacCartney said, "It is not necessary to turn drug stores into something that resembles an old time general store."

He pointed out that recently some retail druggists are "going far afield" in adding non related and highly competitive lines, often inferior merchandise, in their efforts to build ever-larger dollar volume of sales.

The pharmacist is referred to by Mr. MacCartney as a professional man, a designation that carries the connotation of basic behavior. Prescribing for illnesses of man or livestock are out side the province of the pharmacist's professional role as well as beyond his qualifications.

The retail druggist has a well defined place in modern society and on the team of health scientists. He deserves the professional confidence of veterinarians and can expect it in proportion to his performance.

Finest Results

You'll do better with *the Veterinarian's Clipper*

Oster®

Finest results for all professional animal clipping requirements . . . general, plucking length and surgical shaving. You can select the right blade for every operation from a complete range of clipping blades. Detachable cutter head enables you to use all sizes of cutting blades on one clipper.

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(Powder)

Furnishing arsenic (as sodium arsanilate), electrolytes (potassium, calcium, sodium, and magnesium as chlorides) and trace elements (zinc, cobalt, manganese, copper, and iron in chemical combination) for administration in the drinking water for all livestock.

Especially for: Swine dysentery or enteritis
Diarrhea in calves and poultry
Alterative for cattle

Swine and Poultry: 10 oz. per 25 gallons drinking water
Cattle and Calves: 10 oz. per 100 to 300 gallons drinking water

Packed in sealed polyethylene packets (with tear-off and directions only label) for protection from atmospheric moisture.

Package: Carton of 1 doz. 10 oz. packets
25 lb. plastic lined fiber drum

order from your nearest CURTS distributor or direct

CURTS Laboratories, Inc.

Manufacturers of Veterinary Pharmaceuticals Since 1918

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The dangerous, disconcerting interruption in surgery can make the difference between success and failure for the veterinarian—life or death to the patient. And it's an extremely rare occurrence with a reliable, safe anesthetic like

short-acting NEMBUTAL®

(Pentobarbital, Abbott)

Practicing veterinarians over a quarter century have learned to depend on the uniformity and purity of this short-acting anesthetic. When you use it, Doctor, you'll find—

Onset of action is prompt—surgical hypnosis being achieved in just 3 to 5 minutes from a single intravenous dose.

Degree of cerebral depression and duration of anesthesia are easily controlled, lasting from 45 to 90 minutes.

Optimal skeletal muscle relaxation accompanying NEMBUTAL anesthesia facilitates surgery; interruptions during procedures are rare.

Side effects are minimal with safe, easy-to-use NEMBUTAL; and there is little danger of cumulative effect with this short-acting agent.

Order safe, reliable, uniform NEMBUTAL from your Abbott representative, your distributor or from Veterinary Division, Abbott Laboratories, North Chicago, Illinois.

Abbott

Enzyme Supplement for Feeds

Since the initial discovery and announcement about one year ago that enzyme treatment of barley improved such feeds, confirmation has come from many laboratories.

Growth of poultry is depressed when barley is substituted for corn in an ordinary ration. Feed utilization is relatively poor with barley feed and litter moisture problem is aggravated. These matters are unrelated to fiber content but are apparently related to some fraction of barley made available by enzyme action.

Three sources of enzyme are effective: (1) Bacterial fermentation, (2) mold fermentation, and (3) particularly malted barley. Insufficient work has been done to understand specific advantages of either enzyme treatment or the reasons for improvement of barley to essentially equal value of corn by water treatment.

It is expected that though these findings may assist growers in the northwest, they are apt to be of greater consequences in other countries of the world where the small grain is a major feed crop.

MASON'S New KENNEL RUNS
NOW AVAILABLE
For SMALL ANIMAL HOSPITALS
Quickly Erected - NO POSTS REQUIRED
FREE CATALOG
THE MASON FENCE CO., Box 77, LEESBURG, OHIO

Keep Teat **OPEN** Keep it **MEDICATED**

Keep it ***MILKING***

INJURED TEATS, SCAB TEATS, STENOSIS, POST-OPERATIVELY

To maintain unrestricted milk flow and provide antiseptic protection is of first importance in the successful treatment of teat troubles. Dr. Naylor Dilators act both MEDICALLY and MECHANICALLY to provide broad spectrum germicidal activity and gentle, non-irritating support to traumatized sphincter and teat mucosa.
Contain Sulfathiazole — the self-contained anti-microbial medication in Dr. Naylor Dilators provides full time antiseptic activity in the entire streak canal. They do not depend upon packaging ointment for antiseptic or therapeutic properties. The medication is IN the Dilators and is released slowly IN the teat to combat infection, reduce inflammation and keep streak canal open to promote normal healing, natural milking. Positive retention in large or small teats!

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Dr. Naylor Dilators are an ideal vehicle for additional local medication of your choice. To obtain the synergistic bactericidal action of Antibiotics with Sulfathiazole following teat surgery, saturate with your favorite udder infusion antibiotic.

Dispensing Package
16 Dilators

Dr. Naylor's
MEDICATED
Large Pkg. 45 Dilators
Teat Dilators

H. W. NAYLOR CO., Manufacturing Chemists, MORRIS, N.Y.

FERAJECT'S EXCLUSIVE FEATURES

Feraject protein complex-iron injectable contains 100 mg. per 2cc, which gives baby pigs the all important amount of iron necessary for the prevention of iron deficiency anemia.

Aside from the high concentration of complexed iron, Feraject contains NEOJEL as an adjuvant with a stabilizing effect, Vitamin B_{12} as a growth stimulant; and Pyridoxine Hydrochloride (B_6) as an aid to amino acid metabolism.

Feraject is non-toxic and when used as directed, will not disrupt the homeostatic condition present in the normal animal.

The recommended therapeutic dose of Feraject is 2cc. For prophylaxis of pig anemia, the dose may vary from 1cc to 2cc depending upon the degree of iron deficiency.

Feraject is available exclusively to veterinarians in 30cc (15 dose) and 100cc (50 dose) vials.

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FIRST IN PROGRESS...THROUGH RESEARCH

new specific treatment for calf scours

Developed specifically for the control of calf scours, new ENTEFUR provides rapid, effective and safe treatment. ENTEFUR drastically cuts mortality.[1,2] In one study, 60 of 63 ENTEFUR-treated calves survived, whereas in the control group only 3 of 24 calves lived.[2] "ENTEFUR treatment appeared the only factor modifying significantly the course and outcome of the disease."[2]

ENTEFUR contains the new nitrofuran, Furamazone® (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

ENTEFUR BOLUS VETERINARY, small, contains: Furamazone 1 Gm., bismuth subsalicylate 0.26 Gm. Dosage: 1 bolus twice a day for 2 days. Supplied: Box of 24 (6 envelopes of 4 boluses each).

REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

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NOW AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

EATON LABORATORIES, NORWICH, NEW YORK

Complete Line of

Arnold Modern Paraciticides

Packaged for Dispensing and Hospitals

Arnold B.H.C. Mange Oil—Apply with oiler or sprinkler for effective treatment of swine sarcoptic mange and lice. Gal. bottles.

Arnold B.H. Mange Treatment—Specific for sarcoptic mange, lice, fleas and ticks on dogs, sheep, swine, beef cattle. Spray or dip—8 oz. and 1 gal. bottles.

Arnold Flea and Deodorant Bomb—Swiftly kills fleas, lice, ticks on dogs. Eliminates malodor. Aerosol can, 12 oz.

Arnold Fly Killer Dry Bait—Potent fly poison. One pound baits 2000 sq. ft. 1 lb. jars; 25-lb. drums.

Arnold Malathion Flea Powder for Dogs—Promptly kills fleas, stops odors. Stops itching caused by fungus and bacteria. Impregnated with Lanolin for conditioning of coat. 4½ oz. sifter-top can.

Arnold Malathion Flea Powder for Cats—Quickly rids cats of fleas, malodors, and itching caused by fungus and bacteria. Non-irritating. Contains Lanolin for improving coat. 3 oz. sifter-top can.

Arnold Malathion Tick Dip Concentrate—Emulsifies in water. Kills all ticks, fleas and lice on dogs—by sponging, sprinkling, or dipping. 4-oz. and 1 gal. bottles.

Arnold Medicated Tick Salve—Light film spread in dog's ears and between toes prevents or eradicates ticks. Water washable. 1 oz. jars.

Arnold Pest Killer Powder—Kills fleas, lice, nits, ticks, mosquitoes, hornflies, chiggers, spiders, roaches, ants, silverfish. Dust on hair of domestic animals; or dust infested areas and on ground. Shaker-top can, 100 Gms.

Arnold Satina Flea Shampoo—Pleasantly perfumed, coconut oil and synthetic detergent, deodorant and insecticide containing DDT, for bathing dogs. 8 oz. and 1 gal. bottles.

Arnold Screw Worm Bomb—Effective protectant against screw worms and fleece worms. Spray directly on superficial cuts and wounds or in infested area. Aerosol bombs, 11 oz.

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Sold only to Graduate Veterinarians

Wire—Write—Phone—Same Day Shipment

Arnold

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NEW CASTLE, INDIANA, U. S. A.

Veterinary Calendar

Jul. 18-20. **Nebraska State Veterinary Medical Association.** Summer Meeting. Kearney, Nebraska. Dr. W. T. Spencer, 1250 North 37th, Lincoln, Nebraska.

Jul. 20-23. **Alabama Polytechnic Institute,** 51st Annual Conference for Veterinarians. Auburn, Alabama. (Housing facilities available for married couples.) Dean J. E. Greene, School of Veterinary Medicine, Auburn.

Jul. 21-22. **Kentucky Veterinary Medical Association,** 47th Annual Convention. Seelbach Hotel, Louisville, Ky., Dr. Robert H. Singer, 136 Shawnee Place, Lexington, Ky., secretary-treasurer.

Jul. 21-23. **Canadian Veterinary Medical Association,** 10th Annual Convention. Royal Alexandra Hotel, Winnipeg, Manitoba. Dr. J. R. Singleton, 613 Dominion Public Building, Winnipeg 1, Manitoba, chairman.

Jul. 23-24. **Iowa State College,** Annual Conference for Veterinarians. Memorial Union, Iowa State College, Ames, Iowa. Dr. John B. Herrick, Ames, Iowa, extension veterinarian.

Aug. 10-12. **Mississippi State Veterinary Medical Association,** 52nd Annual Meeting. Buena Vista Hotel, Biloxi, Miss. Dr. J. W. Patterson, 221 Second Street, Columbia, Miss., in charge.

Aug. 18-21. **American Veterinary Medical Association,** 95th Annual Meeting. Municipal Auditorium. Philadelphia, Pa. Dr. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Sep. 4- 6. **New York State Veterinary Medical Society,** Annual Meeting. Concord Hotel, Kiamesha Lake, New York. Joan S. Halat, 803 Varick Street, acting executive secretary.

Sep. 28-Oct. 1. **New England Veterinary Medical Association,** Annual Meeting. Dr. C. Lawrence Blackely, 180 Longwood Avenue, Boston 15, Mass., secretary-treasurer.

Oct. 8- 9. **Purdue University,** 46th Annual Short Course for Veterinarians. Purdue University, Agricultural Experiment Station, Lafayette, Ind. Dr. L. M. Hutchings, chairman.

Oct. 6- 7. **University of Missouri,** 34th Annual Short Course for Graduate Veterinarians. School of Veterinary Medicine, University of Missouri, Columbia, Mo. Dr. Cecil Elder, chairman.

Oct. 16-17. **Eastern Iowa Veterinary Medical Association,** Annual Meeting. Hotel Roosevelt, Cedar Rapids, Ia. Dr. F. E. Brutsman, Traer, Ia., secretary.

Oct. 26-28. **Florida State Veterinary Medical Association,** Annual Meeting. Galt Ocean Mile Hotel, Ft. Lauderdale, Fla. Dr. A. R. Chambers, 6116 Main Street, Jacksonville, Fla., secretary.

Oct. 26-29. **Southern Veterinary Medical Association.** Claridge Hotel, Memphis, Tennessee. Dr. A. A. Husman, Raleigh, North Carolina, secretary.

How would YOU diagnose this?

CASE NO. 2 Ventrodorsal radiograph of dog's pelvis indicated traumatic subluxation of right femur. Practitioner suspected early injury resulted in present abnormality of coxofemoral joint. Butazolidin® (Veterinary) *, two tablets (100 mg. each) morning and night and one tablet at noon was administered daily for only four days. Pain and inflammation were relieved and treatment discontinued.

This is another case in which Butazolidin has given prompt, dramatic relief. You can always rely on the outstanding antiarthritic, anti-inflammatory, analgesic and antipyretic activity of Butazolidin.

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Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

Jen-Sal

see X-ray, inside cover
Small Animal Practice Section

SPECIAL
DAIRMOL DUSTING POWDER
FOR GRANULAR VAGINITIS

Antiseptic **Astringent**

"THE DAIRMOL WAY"

Compounded under the direction of veterinarians of exceptional experience. Highly recommended by leading herdsmen as the best treatment for the purpose.

Also mfrs. of LIQUID Dairmol Antiseptic and Deodorant.

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Doctor Cooper Research Director At Jensen-Salsbery Laboratories

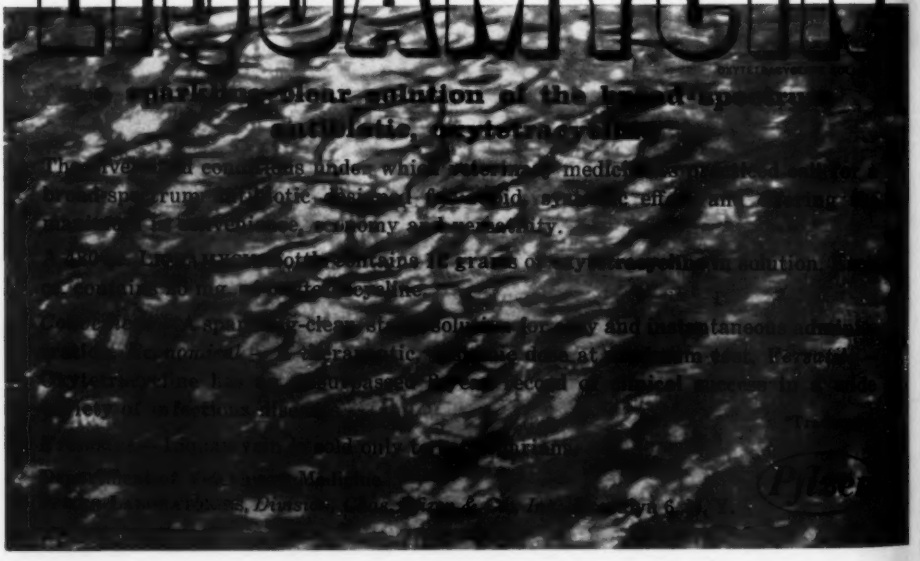
Dr. Carlos M. Cooper

Dr. Carlos M. Cooper, professional services assistant, Jensen-Salsbery Laboratories, Kansas City, Mo., has been promoted to the newly created post of research director.

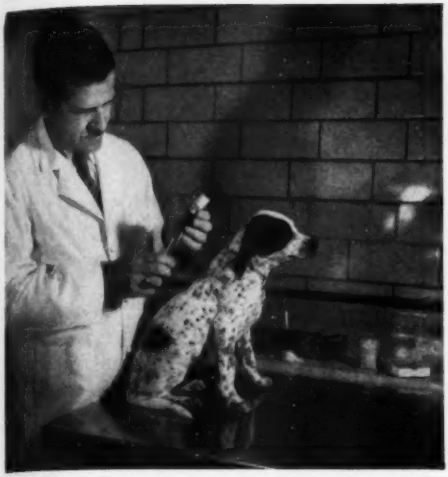
The promotion is in line with the step-up research program at Jen-Sal.

New—for instantaneous use

LIQUAMYCIN



sparkling-clear solution of the broad-spectrum antibiotic, oxytetracycline

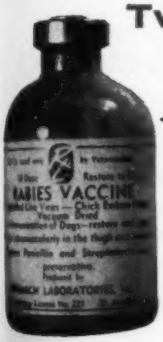


the Veterinarian...

KEY MAN

in the control of Rabies

Two Proven Rabies Biologicals Veterinarians Depend on



RL Rabies Vaccine (Modified Live Virus Chick Embryo Origin)

- Produces high-degree immunity which has lasted in field test beyond 3 years.
- Vacuum dried for safety.
- Vaccine reconstitutes immediately upon introduction of the diluent.
- Rigidly tested for moisture, sterility, safety, and potency.
- RL products are sold only to graduate veterinarians.

RL Rabies Vaccine

Modified live virus, chick embryo origin, vacuum dried. Available in 5—1 dose vials (3 cc. dose), 100 pks. of 5—1 dose vials, and 1—30 cc. 10 dose vial.

RL Rabies Vaccine (Phenolized—20% Tissue Suspension)

- For administration in routine yearly vaccination of pets and/or after exposure to the disease.
- A finely ground homogenous suspension of brain and spinal cord from sheep and goats previously inoculated with Fixed Rabies Virus, National Institute P.V. I. of Health Strain.
- Chemically inactivated with Phenol.
- RL products are sold only to graduate veterinarians.

RL Rabies Vaccine

Phenolized—20% tissue suspension. Available in 6—5 cc. single dose, 1—50 cc. multiple dose, 10—50 cc. multiple dose, and 10 pks. of 10—50 cc. multiple dose vials.

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Saint Joseph, Missouri

NOW... A

"tamed iodine"*

FOR HARD-TO-MANAGE SKIN CONDITIONS

Weladol®

(Polyalkyleneglycol Iodine Complex)

CREME AND SHAMPOO

gives you iodine's potent fungicidal and bactericidal action

... *without* iodine's characteristic toxicity, irritation or stain

Weladol . . . 6 years in the laboratories . . . 3 years in clinical evaluation . . . has been used successfully and safely in a wide range of hard-to-manage skin conditions of dogs, cats, horses and other species of large and small animals.

†U. S. Patent No. 2,759,869 *Trademark

Write for summary of clinical reports on **"Tamed Iodine" in Veterinary Medicine.**

Weladol Shampoo in 4 fluid ounce plastic bottles and 1 quart glass bottles
Weladol Creme in 1 ounce and 1 pound jars

PITMAN-MOORE COMPANY DIVISION OF
ALLIED LABORATORIES, INC.
Indianapolis 6, Indiana

Deaths of Veterinarians

RUSSELL S. BEARDSLEE, UP '28; general practitioner; past member of the A.V.M.A.; at Owego, N. Y., Dec. 1, 1957.

DICK D. BODENHEIMER, IND '16; member of the West Virginia V.M.A.; at Elkins, W. Va., recently.

EVAN O. BURGESS, MCK, at Conneaut, Ohio, Dec. 21, 1958.

FORREST R. CAMERON, MCK '18, 63; member A.V.M.A.; formerly with the A.R.S., USDA; at Hawley, Minn., Jan. 12, 1958.

CAREY C. CARLTON, API '40, 40; practitioner and cattleman; member of Florida V.M.A., and past member of the A.V.M.A.; at Arcadia, Fla., Feb. 5, 1958.

W. C. CARNES, MCK '14, 68; practitioner and mayor, Shelbyville, Ill.; at Shelbyville, Ill., Feb. 22, 1958.

EDWIN B. CAVELL, ONT '06; general practitioner; former member of the A.V.M.A.; at Tawas City, Mich., Jan. 4, 1958.

PRICE R. EDWARDS, SF '13, 73; retired practitioner; member California V.M.A. and past member A.V.M.A.; at Paso Robles, California, Feb. 8, 1958.

ROBERT V. FOX, ONT '22; retired practitioner; at Alba, Mo., Dec. 22, 1957.

GEORGE GORDON, CVC '14, 72; Chicago area practitioner; member of the A.V.M.A. and Illinois V.M.A.; at Chicago, Ill., Mar. 3, 1958.

LESTER J. GORMAN, ISC '39, 43; member A.V.M.A.; Lt. Col., Air Force Veterinary Service (commissioned in the Army Veterinary Corps in 1939 and transferred to the Air Force in 1949); at Lackland Air Force Base, Tex., Feb. 10, 1958.

WILLIAM G. GUTH, KCV '18, 61; district supervisor of Animal Disease Eradication Division at Albuquerque; member of New Mexico V.M.A.; at Albuquerque, N. M., Feb. 12, 1958.

IVAN L. HAWKINS, ISC '15; practitioner; veteran of WWI; at Chicago, Jan. 2, 1958.

DAVID C. HOUSER, KCV '08, 74, practitioner; life-time member of the Missouri V.M.A.; at Jasper, Mo., Feb. 7, 1958.

HAROLD J. JEWELL, KSC '35, 47; former member A.V.M.A.; veteran of WWII; at Sulphur, Okla., Mar. 8, 1958.

HAROLD E. JOHNSTON, ISC '13; member A.V.M.A.; for 32 years in government service; at Waterloo, Iowa, Apr. 24, 1958.

JOHN F. KANE, UP '11, member A.V.M.A.; long-time practitioner at Orange County Veterinary Hospital in Goshen, N. Y.; veteran of service in WWI, first in the Italian army, later in British and American units; at Goshen, N. Y., Jan. 27, 1958.

JOHN L. LABBY, MSU '51, 38; small animal practitioner; member A.V.M.A.; at Blue Island, Ill., Mar. 6, 1958.

W. K. LEWIS, ONT and MCK; meat and stockyards inspector at Chicago; later with B.A.I., USDA at Columbia, S. C.; state veterinarian for Clemson College for 32 years; at Hartsville, S. C., Apr. 4, 1958.

JOHN E. MARSTON, CVC '17, retired practitioner; member of New Hampshire V.M.A.; at Manchester, N. H., Feb. 13, 1958.

WILLIAM A. MARTIN, at Seymour, Ind., Mar. 3, 1958.

OTTO R. MARZILLIER, CVC '18, 76; practitioner for 40 years; at Jefferson, Wisc., Feb. 20, 1958.

WILLIAM J. McKEON, CVC '10; presiding steward, Washington Horse Racing Commission; at Vancouver, B. C., recently.

G. A. MEYER, 75; veteran of service with the Veterinary Corps, U. S. Army, WWI; (since retirement he has lived in both Appleton, Fla., and Pine Lake, Wisc.); Feb. 17, 1958.

WILLIAM C. MUIRHEAD, WES '06, 87; practitioner; at Bradshaw, Nebr., Feb. 17, 1958.

JOHN A. NELSON, ONT '36; small animal practitioner; at Vancouver, B. C., recently.

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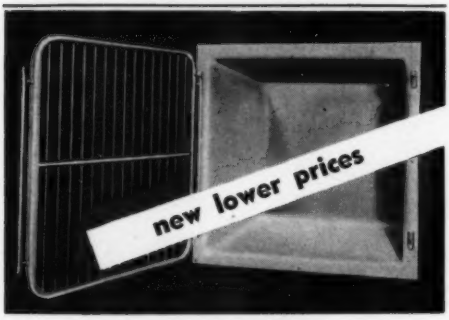

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Deaths of Veterinarians

Continued

CLARENCE R. PALMER, KCV '16, 75, life member A.V.M.A.; 16 years with California Department of Agriculture; formerly with the USDA; at Palo Alto, Calif., Feb. 17, 1958.

CHARLES B. PLACE, GR '18, 64, general practitioner; member A.V.M.A.; past president of the New Hampshire V.M.A.; past member and secretary of the New Hampshire Board of Veterinary Examiners; at Dover, N. H., Feb. 4, 1958.

J. A. PRICE, 67, practitioner; McCracken County veterinarian and livestock inspector for six years; veteran of WWI; at Paducah, Ky., Feb. 10, 1958.

ARTHUR F. PYNN, CVC '14, 64; retired after serving with the Wisconsin Department of Agriculture 39 years; at Oconomowoc, Wisc., June 1957.

FRANK N. ROWAN, CIN '18; general practitioner; at Capmills, W. Va., recently.

HENRY H. SPROSTON, LON '82; retired practitioner; at West Vancouver, B. C., recently.

GEORGE W. STEPHENS, MCK '13, 73; formerly secretary of the West Virginia State Board of Veterinarians; at Blacksville, W. Va., Feb. 1, 1958.

WILFRED H. TIMMONS, CIN '09; life member A.V.M.A.; at Monticello, Ind., Jan. 31, 1958.

HARRY C. WARD, CVC '10, 73; for 50 years a practitioner; life-time member of the Missouri V.M.A.; member of the A.V.M.A.; at Fulton, Mo., Feb. 26, 1958.

CHARLES T. WHITNEY, COR '38, 41, member of the Vermont and New England V. M. A., and the A.V.M.A.; of a coronary thrombosis at Burlington, Vermont, July 15, 1957.

ALLEN A. WILHELM, CIN '20, 63, former practitioner at Fostoria, Ohio; active in civic and social affairs; at Bellevue, Ohio, November 1, 1958.

CHARLES T. WINDRATH, ISC '17, 65; poultry inspector with USDA, at Sibley, Iowa, Feb. 7, 1958.

T. J. WISEMAN, practitioner; former mayor of New Albany, Mississippi, at New Albany, Mississippi, December 3, 1957.

DELL WRIGHT, 82; at Moro, Oregon, November 4, 1957.

RAY S. YOUMANS, COR, '14, 65, practitioner; veteran of both World Wars (during World War I he was with the 42nd Rainbow Division, and during World War II he was with the 26th Division); active as a member of the Massachusetts V.M.A., the Northeastern Veterinary Association, and the Farm Bureau; member of the A.V.M.A.; at Andover, Massachusetts, December 15, 1957.

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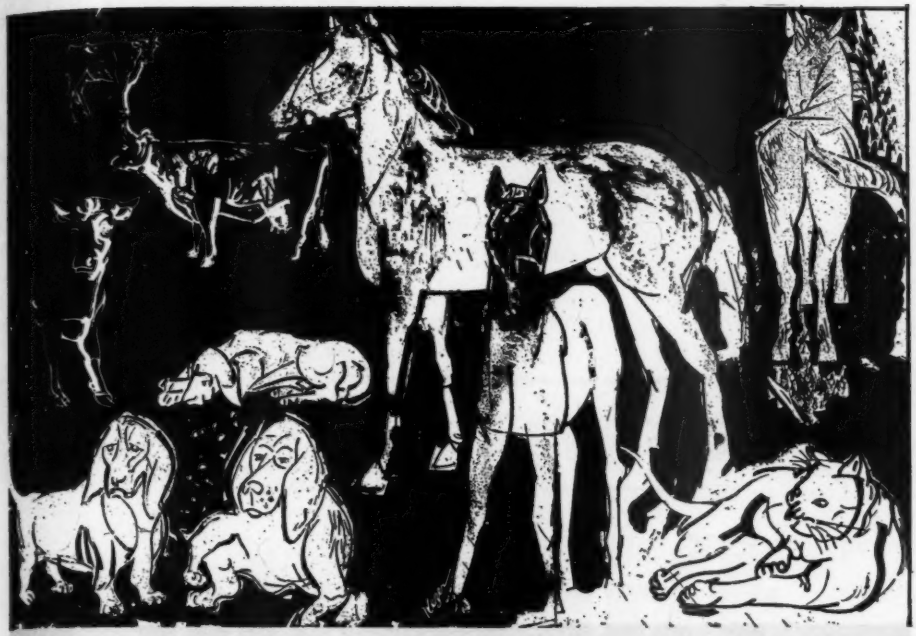

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